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ABSTRACT

The cultivation of talented behavior necessitates identification of (1) the personality attributes inherent in the individual that can serve as predictors of subsequent talented behavior; and (2) the processes by which personality attributes can be reinforced or modified to produce subsequent socially valued behavior. A longitudinal study of Texas public school students was undertaken to isolate factors that would predict academic achievement in high school. Three dimensions of antecedent behavior consistently appear as dimensions of successful intellectual activity: (1) convergent thinking, the ability to give a culturally appropriate response; (2) divergent thinking, the ability to devise new forms and ideas; and (3) symbol aptitude, the ability to recognize and manipulate symbols. The appropriate model for the process of cultivating talented behavior is the dyadic interaction model, which treats the human person as a function of successive reciprocal stimulations between any two of the elements person, culture, and significant others. Extensive multiple regression analysis supports the contention that a small set of variables postulated to be basic dimensions of human behavior are successful in predicting high school academic achievement, and that these predictor variables retain stability across several samples. [Not available in hard copy due to marginal legibility of original document.] (RA)

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DIMENSIONS AND CRITERIA OF TALENTED BEHAVIOR

Final Report of

Prediction and Modification of Human Talent in Senior High Schools

Project No. 1138
Contract No. 5-0743-2-12-1

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and

U. S. Department of Health, Education, and Welfare
Office of Education
Bureau of Research

July, 1968

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DEDICATED TO

Miss Ima Hogg, benefactress who cares,

and

The Hogg Foundation of The University of Texas

for initial support to study valued forms of adolescent behavior

TABLE OF CONTENTS

List of Tables v to ix
List of Figures x to xi
Acknowledgements xii to xiv

Chapter I: Introduction: The Cultivation of Talented Behavior 1-1 to 1-41
  Intelligent, Talented, and Creative Behavior 1-7 to 1-11
  Factor Variables as Gestalten 1-11 to 1-15
  Dimensions of Postulated Antecedent Behavior 1-15 to 1-19
  The Dyadic Interaction Model 1-19 to 1-24
  Transformations of the Model 1-24 to 1-33
  References 1-34 to 1-41

Chapter II: Dimensions and Criteria of Talented Behavior 2-1 to 2-30
  Method: Criterion and Predictor Variables 2-1 to 2-12
  Analyses of Data 2-13 to 2-17
  Results 2-17 to 2-25
  Seventh-Grade Predictors and Twelfth-Grade Criteria 2-25 (A-126 to A-12
  Discussion 2-25 to 2-27
  Conclusions 2-27 to 2-28
  References 2-29 to 2-30

Chapter III: Teacher Evaluation of Academic Achievement 3-1 to 3-25
  Theoretical Background 3-2 to 3-6
  Test of Theory 3-6 to 3-10
  Results of Practical Prediction 3-10 to 3-11
  Results of Cross Validation 3-12 to 3-15
  Discussion 3-15 to 3-21
  Conclusion 3-21 to 3-23
  References 3-24 to 3-25

Appendix A: Section I: Four Texas Communities in Transition A-1 to A-11
  Section II: Casualties in the Cultivation of Talented Behavior A-12 to A-56
  Section III: Description of Variables A-57 to A-78
  Section IV: Basic Data Tables A-79 to A-107
  Section V: Analysis of Data A-108 to A-12
  Section VI: Data for a Comparative Study of Value-Attitudes A-130 to A-147

Appendix B: Methodology B-1 to B-20

Appendix C: Dissertation Abstracts C-1 to C-23

Appendix D: Bibliography of HTRP Publications, 1952-1967 D-1 to D-7

LIST OF TABLES

Table

2.01 Factor loadings and regression weights of appropriate criterion measures for 15 factors representing talented behavior among high school seniors 2-3

2.02 Factor loadings and regression weights for appropriate measures describing nine factors as dimensions of behavior among 1464 students in the ninth grade at four Texas communities of the Human Talent Research Program (HTRP) 2-10

2.03 Intercorrelation of twelfth grade criterion factor variables 2-14

2.04 Intercorrelation of ninth grade predictor variables 2-15

2.05 Intercorrelation of seventh grade and ninth grade predictor variables 2-16

2.06 Intercorrelation of ninth grade predictor and twelfth grade criterion factor variables 2-18

2.07 Multiple R^2 from regressions of 5 selected criterion factor variables on 9 ninth grade predictor factor variables 2-20

2.08 Multiple R^2 regression of 5 selected criterion twelfth grade factor variables on 25 ninth grade predictor variables 2-21

2.09 Comparative regressions of selected twelfth grade criterion factor variables on basic theoretical model and on catalytic models 2-23

3.01 F-tests for the significance of the contribution of the categorical variables in the presence of the remaining variables when predicting high school GPA 3-9

3.02 F-tests for the significance of cumulative variable contribution to the subset of predictors 3-11

3.03 Coefficients of determination (RSQ) on cross validation: Raw score predictors 3-13

3.04 Coefficients of determination (RSQ) on cross validation: Factor scores plus raw score grade GPA 3-14

Table

3.05 Coefficients of determination (RSQ) on cross validation: Stanined predictors 3-16

A.01 Population changes in cities and counties by decades, 1930 to 1960 A-3

A.02 Comparative data on four Texas communities A-4

A.03 Characteristics of population by counties A-5

A.04 Population data from the Human Talent Research Program Grade VII (1957-58) to Grade IX (1959-60) A-15

A.05 Population data from the Human Talent Research Program Grades IX (1959-60) to XII (1962-63) A-16

A.06 Population data from the Human Talent Research Program Grade VII (1957-58) to Grade XII (1962-63) A-17

A.07 Distribution of original HTRP population in Grade VII (1957-58) who did and did not continue to Grade XII (1962-63) by cultural background, sex role and community location A-19

A.08 Distribution of original HTRP population in Grade VII (1957-58) who did and did not continue to Grade XII (1962-63) by family status, sex role, and community location A-20

A.09 Distribution of original HTRP population in Grade VII (1957-58) who did and did not continue to Grade XII (1962-63) by mental function, sex role, and community location A-21

A.10 Distribution of observed HTRP population in Grade IX (1959-60) who did and did not continue to Grade XII (1962-63) by cultural background, sex role, and community location A-22

A.11 Districution of observed HTRP population in Grade IX (1959-60) who did and did not continue to Grade XII (1962-63) by family status, sex role, and community location A-23

A.12 Distribution of observed HTRP population in Grade IX (1959-60) who did and did not continue to Grade XII (1962-63) by mental function, sex role, and community location A-24

Table

A.13 Distribution of disadvantaged, original HTRP Anglo-American students who continued to Grades IX and XII with HTRP transfers or dropouts from 1957-58 to 1962-63 A-25

A.14 Distribution of disadvantaged, original HTRP Latin-American students who continued to Grades IX and XII with HTRP transfers or dropouts from 1957-58 to 1962-63 A-26

A.15 Distribution of disadvantaged, original HTRP Negro-American students who continued to Grades IX and XII with HTRP transfers or dropouts from 1957-58 to 1962-63 A-27

A.16 Distribution of original seventh-grade male students in senior high schools by category and community location A-29

A.17 Classification of students from Grades VII to IX in the continuing HTRP population A-46

A.18 Classification of students from Grades VII to XII in the continuing HTRP population A-47

A.19 Classification of students from Grades IX to XII in the continuing HTRP populations A-48

A.20 Differences among six student types on selected scales A-49

A.21 Summary of data gathered in the Human Talent Research Program from Grade VII (1957-58) to Grade XII (1962-63) with master file number (MFN), form of instrument, and number of subjects (N) A-80

A.22 Distribution statistics with master file number (MFN) of variables in Human Talent Research Program (HTRP) for students in Grades VII, IX, X, and XII A-97

A.23 Intercorrelations among values of HTRP variables for administration in Grades VII, IX, and XII A-107

A.24 Varimax factor pattern for 87 criterion measures of talented behavior characterizing high school seniors in four Texas communities A-109

A.25 Regression weights for 87 criterion measures of talented behavior characterizing high school seniors in four Texas communities A-110

A.26 Intercorrelation of twelfth grade criterion factor variables A-111

Table

A.27 Varimax factor structure of 57 dimensional variables (predictors) measured in seventh-grade year at four Texas community locations of the Human Talent Research Program A-112

A.28 Modal values for 57 dimensional variables (predictors) over 15 factors for students in seventh-grade year in four community locations of the Human Talent Research Program A-113

A.29 Factor loadings and regression weights for appropriate predictor measures describing fifteen factors as dimensions of behavior among 1570 students in the seventh grade at four Texas communities in the Human Talent Research Project A-114

A.30 Intercorrelation of seventh grade predictor variables A-118

A.31 Varimax factor structures of 39 dimensional variables (predictor measures) in ninth-grade year at four community locations of the Human Talent Research Program A-119

A.32 Modal values for 39 dimensional variables (predictors) over 9 factors for students in ninth-grade year in four Texas community locations of the Human Talent Research Program A-120

A.33 Factor loadings and regression weights for appropriate predictor measures describing nine factors as dimensions of behavior among 1464 students in the ninth grade at four Texas communities of the Human Talent Research Program A-121

A.34 Intercorrelation of ninth grade predictor variables A-123

A.35 Intercorrelation of seventh grade and ninth grade predictor variables A-124

A.36 Intercorrelation of seventh grade predictor variables and twelfth grade criterion variables A-126

A.37 Intercorrelation of ninth grade predictor and twelfth grade criterion factor variables A-127

A.38 Regression of 15 twelfth-grade criterion factor variables on 15 seventh-grade predictor factors A-128

Table

A.39 Regression of 15 twelfth-grade criterion factor variables on 9 ninth-grade predictor factors A-129

A.40 Frequency counts, mean ranks, and first choices regarding relative imporatnace of items reflecting value systems among high school seniors in four Texas communities according to sex roles A-132

A.41 Preferred high school image (to be remembered here) selected by boys and girls in the Coleman and HTRP populations expressed in precentages with chi square values derived from contingency tables A-146

A.42 Career preferences ("what would you most want to be") of boys and girls in the Coleman and HTRP populations expressed in percentages with chi square values derived from contingency tables A-147

LIST OF FIGURES

Figure

1.01 Schematic diagram of operations designed to obtain F = _k_ x _k_ matrix of factor loadings from R = a _k_ x _k_ correlation matrix for either a "component analysis" or a "factor analysis" and, in each instance, obtain a principal-factor solution 1-13

1.02 Schematic diagram of operations to obtain _k_ regression weights in each of _r_ column vectors so that the weights represent the contribution of each of _k_ observations to factor scores computed for N subjects 1-14

1.03 Dyadic interaction model for the study of human development and behavior 1-20

1.04 Contexts of development, social learning, and self awareness 1-21

3.01 Contexts of development, social learning, and self awareness 3-3

3.02 An antecedent schematic diagram and mathematical formulation of a model for research in talented behavior 3-5

A.01 Schematic diagram of a community A-7

A.02 Sociogram of the "M" age-grade of Elmtown at age 14 years A-33

A.03 Sociogram of the "M" age-grade of Elmtown at age 18 years A-34

A.04 Sociograph for age-mates (circa 18 years) remaining in the graduating class at Textown senior high school A-36

A.05 Dimensions of cognitive behavior for the selection of student types A-44

B.01 Pretest and Postest B-6

B.02 Collinear regression lines B-8

B.03 Parallel-noncollinear regression lines B-8

Figure
B.04 Nonparallel regression lines B-8

B.05 Constant differences between s_2 and s_1 for any level of C B-15

B.06 Nonconstant differences between s_2 and s_1 for all levels of C B-15

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My own appreciation of Congressional support and an assessment of some outcomes of the Cooperative Research Program appear in an invited statement, "The Nation's Stake in Education for a New Era," printed in the _Congressional Record_ of both the Senate and the House Hearings of "Bills to Improve the Quality of Elementary and Secondary Education" during 1963. This statement not only proposed "centers for multipurpose educational research and development" (which have been implemented) but also a "Joint Commission on Education and National Welfare" (a strategy adopted for the improvement of teacher education). For whatever small part he may have played in bringing about "The Necessary Revolution in American Education" (Keppel, 1966), the writer sincerely acknowledges the wisdom acquired from and opportunities for meaningful communication opened up by the then Vice-President Lyndon B. Johnson and Representative Homer Thornberry as well as Senators Ralph Yarborough and Wayne Morse. The privilege of serving as member and sometime chairman of the ad hoc "Advisory Panel on Educational Research and Development" for Congress along with the then Deans Francis Keppel (Harvard) and Lindzey J. Stiles (Wisconsin), as well as other educators and research persons provided experiences to be long remembered. The responsibility came as a consequence of an appointment initiated by the then Dean Lawrence D. Haskew to serve as Coordinator of Research and Development in the College of Education at Texas (1961-65).

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*References in these acknowledgements follow Chapter I which, with these acknowledgements, provides a necessary orientation to the final report.

The Human Talent Research Program (HTRP) was made possible by the existence of the Laboratory of Human Behavior in the College of Education as a headquarters for faculty-sponsored research activities. The facility also became a center for the graduate education and internships of research personnel learning to be competent in the behavioral science foundations of education. The Laboratory, established in 1954 (the year that Congress passed an Education Act establishing but not funding the Cooperative Research Act), fulfilled a commitment made when the writer moved from Chicago to Texas in September, 1949. Quarters for the Laboratory have been taken over for faculty offices and the "hardware" for computer-assisted-instruction and the kinds of activities now supported by Federal "training grants." Necessary space was gouged out of the basement of Sutton Hall (after the transfer of the Department of Psychology to the newly-built Mezes Hall) with funds provided by the College of Education through the Department of Educational Psychology then under the active leadership of its Chairman, Dr. O. B. Douglas who had been oriented to educational and behavioral science research when he obtained his doctorate under the exacting supervision of C. H. Judd at Chicago.

The initial Laboratory Programs, "The Textown Study of Adolescence" (McGuire, White, & Novak, 1954; McGuire, 1956a), "Psychosocial World of the School" (McGuire, 1954; McGuire & White, 1957), and "Mental Health in Education" (McGuire, 1956b; Peck, 1959; Peck & McGuire, 1959), received small grants from the University Research Council. In addition, some of the crucial "seed money" necessary for programmed research and internships was received from the "built-in" Hogg Foundation at the University. The foresight of the Director, Robert L. Sutherland, and the Associate Director for Research and now Dean of Education, Wayne H. Holtzman, has had subsequent "payoffs" which few of us thought were possible at the time when the Laboratory was established as a research facility.

Much could be said here about the contributions made by people who participated in the initial HTRP undertaking (McGuire & Associates, 1960), the research group who carried out the second phase, Cooperative Research Project No. 742 (McGuire *et al*, 1968), and the persons named in the three chapters and four appendices of this report on Cooperative Research Project No. 1138. Moreover, I cannot express my debt to personnel of the Bureau of Research, U. S. Office of Education, particularly Robert A. Beezer, William R. Carriker (now at Pennsylvania State University), Edwin Hindsman (now Director, Southwest Educational Development Laboratory), Howard Hjelm, and Michael Bohleber. During the long period of gestation of this report I have had the continuing support of Gordon V. Anderson (Chairman of the Department of Educational Psychology), Wayne H. Holtzman (Dean, College of Education), Robert F. Peck and Oliver H. Bown (Co-directors, Research and

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Carson McGuire
Principal Investigator

Austin, Texas

CHAPTER I

INTRODUCTION: THE CULTIVATION OF TALENTED BEHAVIOR

The term, "cultivation of talented behavior," reveals the orientation of this report upon the prediction and modification of human talent in senior high schools. Data from the Human Talent Research Program (HTRP) lend credence to an agricultural model with an emphasis upon processes of development in preference to a mining model which has become associated with the identification and conservation of human talent (Paterson, 1957; Stalnaker, 1961). Despite well-documented analyses of the nature and development of human abilities by Humphreys (1962), Ferguson (1965), and Vernon (1965), however, the mineral model has been given new life by a recent statistical inference that "specific abilities" are to a considerable extent influenced by biological heredity but less so that "general ability" (Nichols, 1965).

The two models, the agricultural and the mineral, clearly are associated with the conflicting derivations and antithetical meanings assigned to education. Along with Ralph Barton Perry (1954, p. 426), our HTRP experiences confirm the view that the word "education" derives from the Latin educare and educatus ("to rear"--agricultural model--i.e., cultivate) and not, as some would hold, from educere ("to draw out" latent possibilities--mining model--e.g., identifying talent). The dilemmas encountered in undertaking a developmental approach to the study of human talent(s) and the multidimensional nature of human abilities have been discussed in the second HTRP report for Cooperative Research Project No. 742 (McGuire, Murphy, Jennings, Whiteside, & Foster, 1968, pp. 2-8 to 2-22). Moreover, with the exception of a report from a committee of the Social Science Research Council (McClelland, Baldwin, Bronfenbrenner, & Strodtbeck, 1958) and a Bingham Lecture by another member of that committee (Wolfle, 1960) as well as a series of lectures in that tradition published in the American Psychologist, the concept of "talent" is foreign to the literature of American psychology.[1]

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[1] The Psychological Abstracts and the Annual Reviews of Psychology have no dearth of references to the topics of "ability" and "aptitude" which, presumably, are cognate to "talent" in the language of psychology. Unfortunately for the behavioral sciences, although English permits reference to "talented persons," one can only refer to individuals as having abilities and possessing or

This overview of theory and research based upon data gathered from boys and girls prior to and during their senior high school years in the four communities participating in the HTRP (Appendix A, pp. A-2 to A-11) goes well beyond the commonly accepted idea that the years of schooling are and should be concerned only about the development of intellectual talent. Consequently, the introductory chapter indicates reflective consideration of and awareness of contrasts among intelligent, talented, and creative forms of behavior to be *explained* and *evaluated* in terms of a *dyadic* interaction theory of human development and behavior. Transformations from current monadic to dyadic (or polyadic) views not only permit a dramatic shift from reification of intelligence, talent, and creativity as entities (Wesman, 1968) but also allow an *adualistic* genetic epistemology wherein biological, sociological, and anthropological facets of psychological phenomena are not disregarded. The transformation not only has posed an exciting challenge but also has taken more time than expected to lay a foundation for the translation of educational theory, research, and practice into a behavioral science meaningful to professional personnel and to concerned historians, philosophers, and the policy sciences.

Re-Orientation of the Theory-Research Approach in the HTRP

A combination of unforseen circumstances, including McGuire's CVA and a long recovery period, has forced postponement of this final report from 1964 to 1968, a full ten years after the publication of *Talent and Society* by a committee of the Social Science Research Council (McClelland *et al*, 1958). During that interval, a number of experiences and encounters with others' work have led us to a thoroughgoing re-examination of assumptions about the nature of human development and evaluated behavior studied operationally in the four HTRP communities. Quite clearly, a considerable amount of change has taken place not only in the organizing ideas of those who undertook the HTRP as a longitudinal inquiry

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showing aptitudes. In other words, the terms currently employed in psychology synonomously with talent--aptitude, ability, and the like--stand for psychological traits which refer to the characteristics of persons; that is, "inside tendencies of some sort" (Allport, 1966) and not "response capabilities" or "*extant behavioral repertoires*" in conjunction with various contexts of behavior (Wallace, 1966). The dynamic meaning of "talent" (e.g., "we have recruited the best talent available") has been lost to psychology by restricting concerns to the intellectual elements of aptitude and ability.

but also in the zeitgeist, or spirit of the times, defining what is pertinent to the study of man and his behavior over a period of years. For example, members of the original research team and their subsequent colleagues have encountered phenomena such as the following:

1. Tacit acceptance has been demonstrated by critical review and publication of a method for introspective multivariate behavioral research involving a discrimination model for psychological measurement wherein Q values for a structured sample of self-reference statements are mapped into algebraic fields (McGuire & Fruchter, 1967). The Q values, which permit recovery of the original discriminations, are assigned in a manner such that sophisticated statistical analyses can be carried out and inferences made about the truth value of any theory and derived hypotheses incorporated into the prestructured sample of multi-faceted Q statements to which sample populations of subjects respond. This concept of a metric within persons leads to operations whereby subjects may represent the being (self concept), doing (role behavior), relating to (interpersonal relatedness), and evaluating (behavioral feedback) facets of their self-perceived or other's behavior as well as their own or other's personalities. Each of the four replicated dimensions of self-description has another facet in terms of four psychological orientations; namely, (a) one's feelings or intensional frame of reference, (b) dependency upon authority figures, (c) reality testing or extensional frame of reference, and (d) awareness of discontinuities or openness to experience. Consequently, the example in the 1967 article has 32 self-descriptive Q statements.

The relative objectivity of multifaceted Q representation legitimatizes the study of central processes, particularly self-awareness, personal constructs, and/or schemata postulated to be operational in various categories of adaptive behavior. Employed imaginatively, the approach could turn out to be one of the necessary steps toward accomplishment of the second of two stages in the development of psychology in a form that goes beyond the S-R formula as predicted by Hebb (1960) in "The American Revolution," his APA presidential address at Chicago. To some of us, particularly in educational psychology, the challenge became not only "to establish an equally thoroughgoing behavioristics of the thought process" (Hebb's words, p. 736) but also to undertake "a systematic analysis of various theories (and supporting data) about the nature and development of central processes as behavioral controls with the purpose of extracting their major contributions to a genetic epistemology[2] of intelligent behavior" (Rowland & McGuire, 1968a; 1968b, p. 7).

2. Recommendations from a Research Conference on Gifted Children sponsored by the USOE at the University of Wisconsin were the products of discussions held from September 25th to 29th, 1962, after the thirteen participants had exchanged working papers and supporting data. Among the materials reviewed were research papers from the HTRP at Texas (McGuire & Associates, 1960; McGuire, 1961a, 1961b; and many of the tables which appear in McGuire et al, 1968; as well as selected data appearing in this report). The publication which resulted from the Conference reflects agreement upon "three generally accepted assumptions (which) cast long shadows into the future in terms of types of research being planned and the kinds of educational programs that will be presented in the future to intellectually superior children--indeed to children of all ability levels" (Gallagher, 1964). The three propositions can be summarized briefly with references to their impact upon the preparation of reports from the HTRP.

(a) Intellectual talent should be considered multidimensional. This point of view necessitates some redefinition of intellectual talent and a search for intellectual dimensions overlooked through uncritical acceptance of IQ as an operational definition of intelligence. The work of Guilford summarized in his recent book as a structure-of-the-intellect theory (1967) and the case for studying the development of central processes which control impulsivity and guide intelligent behavior (Rowland & McGuire, 1968a, 1968b) are examples of structural and functional approaches, respectively. When Guilford's latest article in Science, "Intelligence Has Three Facets" (1968) is interpreted in terms of information theory, however, the two approaches can be related to one another so as to become quite meaningful. Guilford's four types of content may be regarded as "inputs," his five dimensions of operation as properties of "central processes," and his six categories of product might be interpreted as kinds of "output." Approached in this manner, one does not have to develop a test for each of the 120 cells of Guilford's model. Intelligence no longer should be regarded as an entity, reified as "something in the head" by uncritical users of the term, but becomes an attribute manifested in adaptive "acts of intelligent behavior" (Wesman, 1960) guided by central processes that select among response capabilities[3] acquired through learning experiences.[4]

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[2] "Genetic epistemology," a term originated with James Mark Baldwin as did the theory of "schema" in logic (1902, 1906), is concerned with the development of knowledge-gathering processes. Jean Piaget (1966), who traces his "adualistic" view of phenomena to Baldwin (p. 114), currently is probably the world's best known genetic epistemologist (1967).

(b) Educational talents are, to an unknown extent, capable of modification. The original plan of the HTRP dexcribed by Hindsman and Duke in terms of "Development and Utilization of Talent" (1960), envisaged "the planning and testing of the effects of certain educational telesis." At that time, we began to define education, including many facets of special education, as planned intervention into child and human development. In terms of the dyadic model (see Figure 1.03 on page 1-20 and footnote 4 on this page), the act of teaching involves the introduction of planned discontinuities into the ongoing experiences of learners. Evaluation of the changes in central processes and behavioral capabilities of the learner by one's self (Alpha) or by a teacher (Beta) also are important elements of an effective educational encounter. Within this framework, educational encounters may be designed to encourage "Learning and Thinking" (Bruner, 1959) and "The Act of Discovery" (Bruner, 1961a) with a reasonable awareness of the simultaneous processes involved in the act of learning--acquisition of new information, transformation (cognitive restructuring), and evaluation (Bruner, 1961b, pp. 48-52); to recognize the place of intrinsic motivation in the form of competence (White, 1959), epistemic behavior (Berlyne, 1960, 1966), and an incongruity-dissonance principle governing information-processing (Hunt, 1960); and to attend to the cogent analysis summarized in Shaplin's "Practice in Teaching" (1961), a memorandum from the 1960 summer Teacher Education Conference at the Center for Advanced Study in the Behavioral Sciences.

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[3] The English word, "capability," stems from the Latin roots, capax and capabilitas (v. capio). Perhaps the shades of meaning implicit in the language of this report may be conveyed by contrasting non capax mentis (not intellectually capable) with non compos mentis (not intellectually composed) where the added dimension is the absence of smooth, effective functioning of the cognitive processes. This phenomenon, involving what is to be termed a catalytic model or the influence of a moderator variable (Saunders, 1956), is demonstrated in a study of the consequences of impulsivity (employing a measure of impulse controls) in the central processes reported in Chapter 3.

[4] In the theory developed in this report, "experience" brings about transformations in the organization (or schemata) of central processes (Berlyne, 1965, pp. 113-123). The "equilibration," to use Piaget's term (1961), is brought about by encounters with discontinuities in one or a combination of three interacting environments (the genetic or gene-controlled, internal or neuro-endocrine, and external or nutritional-social-psychological) which form the nexus of "being human." In terms of the dyadic interaction model (See Figure 1.03 on p. 1-20, "Dyadic interaction theory of human development and behavior"), an important facet of the developmental environment is a consequence of the reciprocal stimulation between the developing organism (Alpha) and cultural agents (Betas) who are objects of identification in the external environment. The most significant Betas, who provide models in social learning, are parents (close-tied authority figures with emotional involvements in the new "individual replacement"), more remote adult authority figures such as teachers, and age-mates (same sex and other sex) who can accept, avoid, reject, or isolate the new member of a human society.

In our proposals, *educational telesis* was defined as "planned, purposeful manipulation of experiences hypothesized to influence pupil change in a desired direction." In the beginning, *talent* was defined simply as "the ability of an individual to perform some significant and socially valued act." With experience, however, the definition changed, "*talented behavior* involves both personally-significant and socially-valued competencies, including signs of creativity, recognized as such through performances or products which can be assessed by other persons" (McGuire, 1961, p. 46). Unfortunately, during the final negotiation of each of the HTRP Cooperative Research Program projects, the agreements deleted funds proposed for naturalistic experiments in modification of educational encounters, leaving only the longitudinal prediction study and changes over developmental periods in four school settings as the foci of the HTRP. In the light of a *zeitgeist* where the focus was upon "experimental design" and a premium was placed upon contrived experiments wherein variables were skeletonized and cultural contexts were established largely by giving instructions, we could understand why some of our proposed naturalistic experiments were not funded. At this writing, however, there seems to have been some vindication of our views which held that complex processes should not be trivialized so as to be certain of unequivocal results and that findings from such "experiments" often could not be translated back into practice. With the advent of a policy favoring cooperatively funded research and development activities in education, proposed by us in 1962 and 1963, we find an increasing acceptance of the multivariable designs and uses of the computer of the kind developed by the HTRP staff, their colleagues, students and consultants; for example, multivariate analyses of nomination data (Hindsman, 1960), dimensions of talented behavior in terms of factor variables (McGuire, Hindsman, King, & Jennings, 1961), multivariate analyses of test performances (McGuire, 1961b), factor and series matching for common dimensions (Spector, 1963), applied multiple linear regression (Bottenberg & Ward, 1963), multivariable prediction and cross-validation (Jennings, 1963; Whiteside, 1964), multivariate analyses of transformations in personality from preadolescence to early adolescence (Foster, 1963), canonical analyses of relations between predictor and criterion variables (Jones, 1964), multivariate analyses of changes in teacher evaluations of pupil performance (Starr, 1964), subroutine systems for data processing (Jennings, 1964), multiple discriminant prediction (Kelly, Veldman, & McGuire, 1964), matrix formulas (Jennings, 1965), factor-analytic experimental designs (Fruchter, 1966), analyses of variance by regression procedures (Jennings, 1967), multivariate Q representation (McGuire & Fruchter, 1967), as well as a valuable handbook on Fortran Programming in the Behavioral Sciences (Veldman, 1967). Since records have been kept of discontinuities encountered by HTRP students and data for the six-year period designated in Appendix A (Section IV, pp. A-80 to A-107) are retreivable, a number of studies in addition to those outlined in Appendix A in the form of working papers could be carried out to test relevant theory and hypotheses.

(c) There exists a close relationship between motivational and personality variables and the development of intellectual abilities. One of the early research reports which prompted inquiry into the interplay between cognitive, personality, and behavioral variables was a seven-year study of gifted children at the Laboratory School of the University of Chicago reported by Haggard (1957). Much of the pertinent research upon personality factors as predictors of academic performance has been summarized effectively by Lavin in his theoretical analysis and report of research to the Russell Sage Foundation on The Prediction of Academic Performance (1965, pp. 64-121) which also considers sociological determinants (pp. 122-156) and intellective factors (pp. 47-63). Several references are made to HTRP studies particularly in regard to the influences of anxiety (for example from the entries in Appendix D, Phillips, Hindsman, & McGuire, 1960) and multivariate research (McGuire, Hindsman, Jennings, & King, 1961). In his treatment of measures of impulsivity (pp. 81-83), Lavin apparently did not have access to Whiteside's dissertation (1964) which forms the basis of the predictive and cross-validation studies of Chapter III wherein the absence of impulsive controls (low scores on STEP Listening) add significantly to the prediction of teacher assessments of achievement in the four communities. Lavin's Chapter 7 on "Directions for Future Research " (pp. 157-171) might be examined after reading the third chapter of this report in addition to Gallagher's research critique (1964) which has provided a framework for this section of the introductory chapter.

Intelligent, Talented, and Creative Behavior

Earlier in this chapter the point has been made that too many professional people in addition to the lay public use the terms intelligence, talent, and creativity in the nominal sense and consequently look upon them as entities or essence concepts of intellectual qualities. There are current warnings against this approach over and beyond Rowland & McGuire's Emergent Views of Intelligent

Behavior: Men and Their Ideas (1968a) wherein they hold that central processes organized through experience (refer to footnote 4 on page 1-5 of this chapter), personality, and social behavior are facets of the same phenomena. Their dyadic interaction model would suggest that becoming and behaving as a human being guided by organized central processes occurs only when a relatively biointact, biocompetent developing organism (Alpha) encounters reciprocal stimulation in dyadic interaction with cultural agents (Betas) as depicted in Figure 1.03 on page 1-20 to follow. Among the present-day writers are Wallace (1966) who makes a clear distinction between "response predisposition" and "response capability" in "An Abilities Conception of Personality;" Anastasi (1967), who warns against "strange notions of 'innate intelligence'," advocates behavioral tests of intelligent behavior (p. 301), and suggests "that the separation between abilities and personality traits is artificial" (p. 304); and Wesman (1968) who directs attention to "Intelligent Testing."

In this section of the introductory chapter, the suggestion is made that, although one may distinguish among intelligent, talented, and creative behavior, the dyadic interaction model applies to each and to the evaluation of the several kinds of behavioral capabilities (see preceding footnote 3 on page 1-5). Much can be gained by examining the etymology of the three concepts of valued behavior. The English word "intelligence" in its several forms is derived from the Latin words *intus legere* which mean "to read what is within" and imply some internal or central process. Behavior becomes adaptive when it is governed by such a central process or operations organized through experiences, particularly in relatively biointact and biocompetent organisms capable of responding to sensory feedback and to the reciprocal stimulation of dyadic and polyadic interaction with cultural agents along with their artifacts and symbols. Behavior mediated by central processes should be regarded as "intelligent"--coping with new situations by appropriate adaptations of their response repetoires. In contrast to intelligent behavior, there is sense-dominated (Hebb, 1966, p. 83), cue-dependent, or stimulus-bound (Pratt, 1948, p. 162) behavior, which is totally dependent upon input from the senses and tends not to function in a mediated, $S_{env}\longrightarrow(\longrightarrow R'::S'\longrightarrow)\longrightarrow R$, or hypothesis-testing manner (Berlyne, 1965, p. 9) but, instead, assumes the characteristics of habitual (sHr) or avoidance (sIr) responses. As Bruner (1961a) so effectively points out in "Act of Discovery" (pp. 28-29), even Pavlov recognized that contiguity and the method of stimulus substitution were inadequate concepts to deal with higher forms of learning and, consequently, he and other Russians introduced the idea of the "second signalling system" concerned with "systems of verbal elaboration" (Vygotsky & Luria) which had the effect of freeing learning and behavior from immedite stimulus control.

The English word "talent," often used in nominal designations such as "talent scout" and "talent show," has been derived from the Latin *talentum* (an ancient weight, or money unit) and the Greek *talanton* (a balance, a thing weighed). Thus the word "talent" implies both something of worth and an act of evaluation. Consequently, in popular usage, the concept has become associated with the natural endowments of a person; that is, an individual who is gifted with intellectual and other valued abilities. A talent scout, for example, is one who is engaged in discovering and recruiting people of talent for a specialized field or acitivity such as the scouts employed directly or indirectly by professional football and baseball clubs or theatrical agents. Most of the coaches, talent agents, or directors reify the term and often speak of "God-given abilities" or "natural endowment." True, the talented athlete or musician has to have certain qualities which appear to be inherited biologically but the cultural inheritance, particularly an early exposure to athletic, artistic, or musical experiences in dyadic or polyadic settings, may be a crucial element in the development of various kinds of talented behavior. In a previous report, McGuire and Associates (1968) extensively examined the multidimensional nature of human abilities and the several models employed to represent and to evaluate them (pp. 2-14 to 2-28). They finally arrived at the view that the various forms of talented behavior should be regarded as sets of behavioral capabilities (what persons "can do") evaluated operationally by values or scores assigned for responses to psychological scales, to sociometric valuations by cultural agents (for example, age-mates and teachers), as well as to responses elicited by psychometric instruments. A particular cultural group may elect to view any behavior or attribute whatsoever as being talented, valued or disvalued. In general, most individuals who commonly interact within a cultural setting, or recognize a given reference group (Merton & Kitt, 1950; Merton, 1967, pp. 30, 49, 64; Sherif & Cantril, 1947 and 1966, pp. 199-279, especially 201-220 and 252-261; Sherif & Sherif, 1965, pp. 254-258, 278-282, and especially 327-329) tend to agree upon several broadly defined areas of competence (evaluated sets of response capabilities) as talented behavior or abilities. For example, in track and field clubs or college squads, the behavioral capability (a resultant of genetic, internal, and external environments) is a precondition to running a four-minute mile. But an individual who is "talented" does not always live up to his "potential." Whether or not a runner attains the desired performance in any given race depends upon other than biological capabilities; namely, central processes (planning), situational factors (conditions), and motivational considerations (incentives).

The transitive verb, "create," with its English derivations, traces back to the Latin creatus, the past participle of creare (to bring into existence). MacKinnon and his associates in the Institute of Personality Assessment and Research at California (Berkeley) have been carrying on Carnegie-financed studies of creative persons such as architects nominated by their peers. Creativeness, in MacKinnon's view (1962), involves a process wherein three conditions are fulfilled; novelty or originality of thought or action, adaptation to reality, carried through to realization of some recognized goal. The time taken may be brief, as in musical or other artistic improvisation, or involve a considerable span of years. One of his associates, Crutchfield (1963), gathered data almost a decade earlier which led him to believe that creative thinking is inhibited in persons who display a tendency toward conforming behavior. There is an understandable progression in the reports McKinnon has addressed to educators beginning with an account of assessment procedures which led him to a generalization about the creative person as "The Highly Effective Individual" (1960) who usually is characterized by an "openness to experience" perceptive "both of the outer world and his inner experience" usually with a "focus upon deeper meanings and possibilities" (p. 373), not stimulus-bound (that is, intelligent) but ever alert to the "as-yet-not-realized," and capable of independent thought and action. For the NEA report of a Project on the Academically Talented Student directed toward Productive Thinking in Education (Aschner & Bish, 1965), McKinnon focused upon "Personality Correlates of Creativity" (pp. 159-171) and characterized the creative individual as being intelligent (making up for any lack of verbal fluency on the Terman Concept Mastery Test with a cognitive flexibility which permits adaptive inventiveness), original (encouraged by opportunities to pursue ideas in depth and in scope), independent in thought and action (developed when the able student is provided with maximum opportunities to pace himself, to learn through guided discovery, and to work out his own interests). Trusted cultural agents (parents, teachers or counselors, and agemates as Betas) facilitate the development of creative behavior in Alphas when they respond to what MacKinnon terms "intuitive perceptions" instead of requiring stimulus-bound "sense perceptions," when they tolerate nonconforming behavior, and when they convey an empathetic understanding of another being "open to experience, both of the inner self and of the outer world" (pp. 166-167).[5]

The common bonds among intelligent, talented, and creative behaviors are at least twofold: (a) each is guided by "central processes" organized and re-organized through experiences in dyadic and polyadic interaction systems involving Betas, the symbols, and the artifacts they employ; and (b) each form of behavior is differentiated and evaluated in terms of an observed sample of response capabilities. All three concepts not only suffer from reification, wherein intelligence, talent, and creativity become names of entities, but also they become confused with terms such as "genius," "gifted," and "bright." The report of the Wisconsin Conference (Gallagher, 1964) defines a genius simply as "a person who does easily what no one else can do at all" and, elsewhere, giftedness has been defined as "consistent excellence in any field of human endeavor," a generalization subject to most of the qualifications in the preceding paragraphs. Parents of "bright" children, and sometimes even their teachers, seldom stop to realize that brightness is a relative term. Both parents and teachers readily talk about the boy or girl in the family or in the classroom who is "bright" in the intellectual sense. Then, as if to compensate, they talk about the ones who, instead of being "sharp as a needle," are "shining lights" or the ones who have "sunny dispositions." What they seldom realize is that being bright in any of these three senses is not necessarily a quality predetermined by the genes passed on by mother and father.

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[5] MacKinnon has supplemented these views in a W. P. S. Presidential Address at Portland, Oregon, published under the title "Personality and the Realization of Creative Potential" (1965) wherein he relates relevant aspects of Otto Rank's theories (which also influenced Carl Rogers) to his own studies of creative persons. The article fits with what Maslow (1968) depicts as "Third Force" or humanistic psychologies highly relevant to the educational encounter since "we are witnessing a great revolution in thought, in the Zeitgeist itself: the creation of a new image of man and society and of religion and science" (p. 685)... (rejecting) "the whole conception of science as being value-free" (p. 687). The points of view expressed in the two articles support our replacement of monadic, "classical," "academic" psychology with a dyadic interaction model which facilitates research bearing upon "the higher nature of man" (p. 686).

Very few persons in any sample population are aware that the significant ongoing experiences of being human are brought about by encounters with discontinuities in one or a combination of three interacting environments--the genetic, the internal, and the external. They start to operate as the DNA and RNA of the chromosomes, the nucleoproteins of the cytoplasm, and cell divisions of the zygote implanted in the mother's womb after conception began the process of development (growth in mass, differentiation, integration, and maintenance of dynamic equilibrium) through embryonic, foetal, neonatal, and subsequent periods. All three continue through the human life cycle. The various forms of DNA and RNA remain active until death; the neuroendocrine environment has its psychological facet in the Self; and the external environment remains meaningful as long as there is some form of reciprocal stimulation provided in dyadic or polyadic transactions with the Self or by encounters with the persons, objects, and symbols of the external world.

Factor Variables as Gestalten Representing Underlying Dimensions of Antecedent or Consequent Behavior

Only Max Wertheimer, among the founders of gestalt psychology, seemed to believe that analysis of gestalts or Gestalten (to use the original German term for the configurations or totalities observed as unified wholes) was not altogether eliminated by gestalt theory. His studies in "productive thinking" (1945) led him to believe that methods for the description and measurement of structures and whole qualities could be developed. Major operations in his theory of productive thinking involved centering (transition from a personally-centered to a detached view of the whole situation in the light of structural requirements) and recentering (obtaining a new and penetrating perspective). Consequently he seriously questioned the usefulness of repetition in learning, writing "it easily induces habits of sheer mechanical action,... instead of thinking,... (or) facing a problem freely" (p. 112). His principle of proximity, closeness of the components in space or time, led to a concept of "gestalt factor"--that is, "a condition favorable for an aggregate to be perceived as a whole" (English & English, 1958, p. 225).

A chance remark by Professor Harvey Dingman during the "reciprocal stimulation" of Dr. Thomas Rowland's doctoral examination, a polyadic setting, led to the foregoing reference work and the concept of factor variables as gestalten representing underlying dimensions of the "predictor" and "criterion" variables in the HTRP. The "estimation of factors in persons," including the use of multiple-regression methodology to obtain optimal weights for scores on each test so as to remove linear restraints (reducing spuriously large factor loadings to regression weights representing the relative contribution of each test to the whole factor), permitted the computation of a factor score for each person in terms of his evaluated responses to each test (Guilford, 1954, pp. 524-526). The use of a CDC 1604 computer and appropriate programs (Veldman, 1967), calling for subroutines development for the HTRP (Jennings, 1964), facilitated the execution of all operations to obtain scores for each subject over each set of "predictor" or "criterion" factor variables in one "pass." In other words, the flow chart began with scores of each person on each test and concluded with a provision for computing the factor score for each subject over every "factor in persons" (to use Guilford's term) obtained from a given set of data for a known population at a certain time in the longitudinal HTRP operations.

Perhaps the foregoing operations with data, explained more precisely in Appendix B reporting "Methodology," pp. B-16 to B-19, may be represented more effectively with Figures 1.01 and 1.02 the earlier assumption that the human cortical substrate has preference for order, for organizing reality into relatively simple perceptual configurations. Next, regard factor analysis as a way of extracting meaningful gestalten from a large number of correlation coefficients. The $\underline{r}$ categories of test behavior derived from the intercorrelation of $\underline{k}$ tests for $\underline{n}$ subjects may be viewed as gestalten or underlying dimensions of behavior for which each test has a factor loading (which may be a positive or negative value, or "0").

Turn to Appendix A, Section V on "Analysis of Data" to recognize the 15 column vectors of Table A.24 on page A-109. The 15 factors each have 87 factor loadings, one for each test. The six-

Rationale.- Of necessity, the emergent central processes in a relatively biointact substrate of a human being seeks to organize reality into simple meaningful configurations or Gestalten. Factor analysis is a generic term applied to means of obtaining an overview of a large number of correlation coefficients by representing the common variance they express, measured in pairs of variables taken two-by-two, in terms of a limited number of components or factors (Harris, 1962, p. 129).

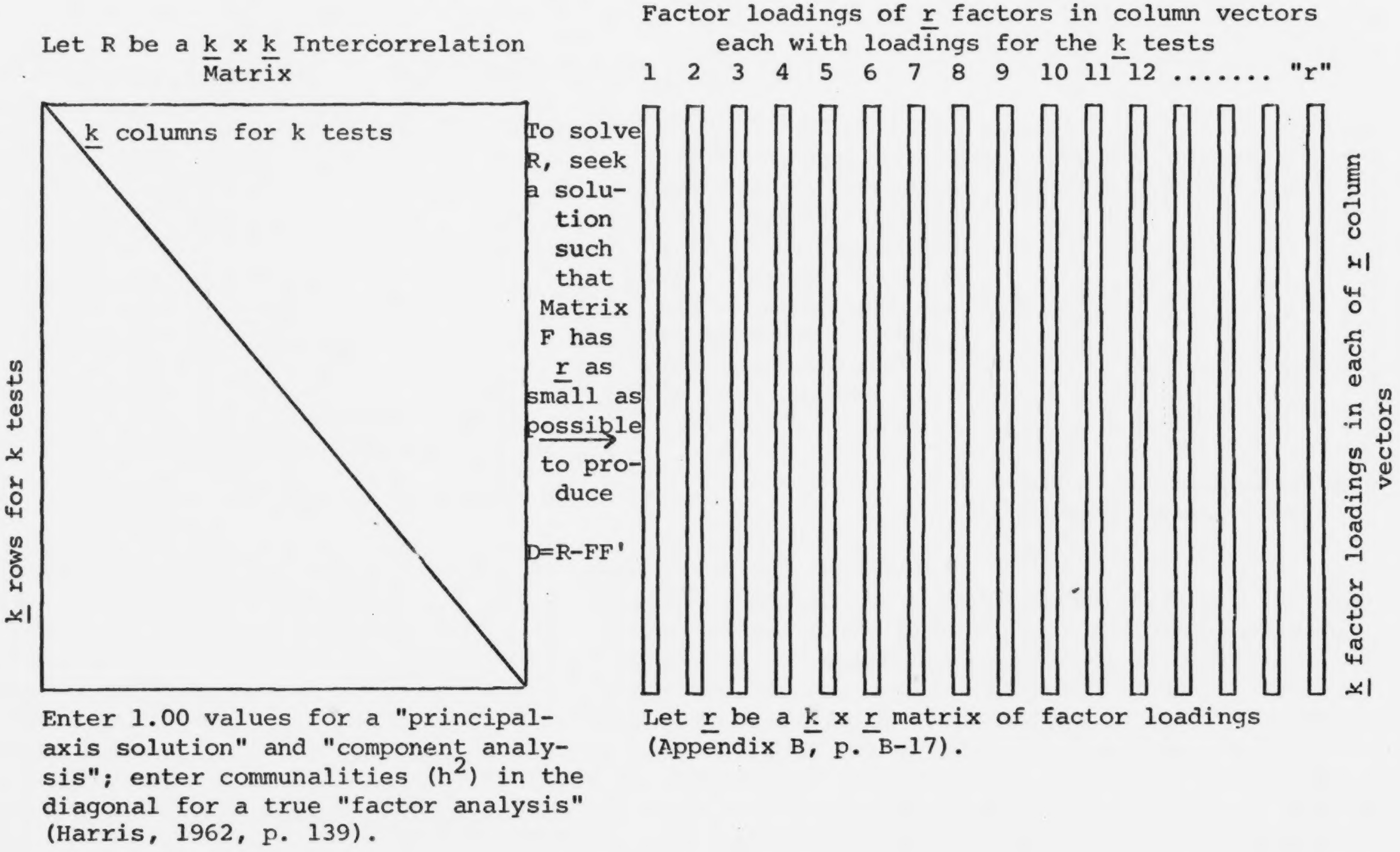
Let R be a k x k Intercorrelation Matrix
k columns for k tests
k rows for k tests
To solve R, seek a solution such that Matrix F has r as small as possible to produce
D=R-FF'
Factor loadings of r factors in column vectors each with loadings for the k tests
1 2 3 4 5 6 7 8 9 10 11 12 .... "r"
k factor loadings in each of r column vectors
Enter 1.00 values for a "principal-axis solution" and "component analysis"; enter communalities (h²) in the diagonal for a true "factor analysis" (Harris, 1962, p. 139).
Let r be a k x r matrix of factor loadings (Appendix B, p. B-17).

Figure 1.01. Schematic diagram of operations designed to obtain F = k x r matrix of factor loadings from R = a k x k correlation matrix for either a "component analysis" (enter 1.00 in diagonals for an "analysis of the data at hand") or a "factor analysis" (enter row communalities, h^2, in diagonals of R) and, in each instance, obtain a principal-factor solution.

Rationale.- In *Productive Thinking* (Harper, 1945), Wertheimer expressed a belief that methods for the description and measurement of structures and whole-qualities can be developed. Assume that the column vectors of factor loadings in Figure 1.01 are potential Gestalten. The problem is to remove "linear restraints" (Guilford, 1954, p. 404), or inflated factor loadings of correlated tests, so that the contribution of each element (test or observation) to the total configuration can be estimated for each of the r Gestalten (column vectors). The problem has been solved by applying Rao's method of pivotal condensation, whereby the original triangular matrix of correlations is postmultiplied by each column vector (from Figure 1.01) in turn, such that the "sweep out" yields a set of r column vectors of regression weights which represent the contribution of each element (test or observation) to each Gestalten.

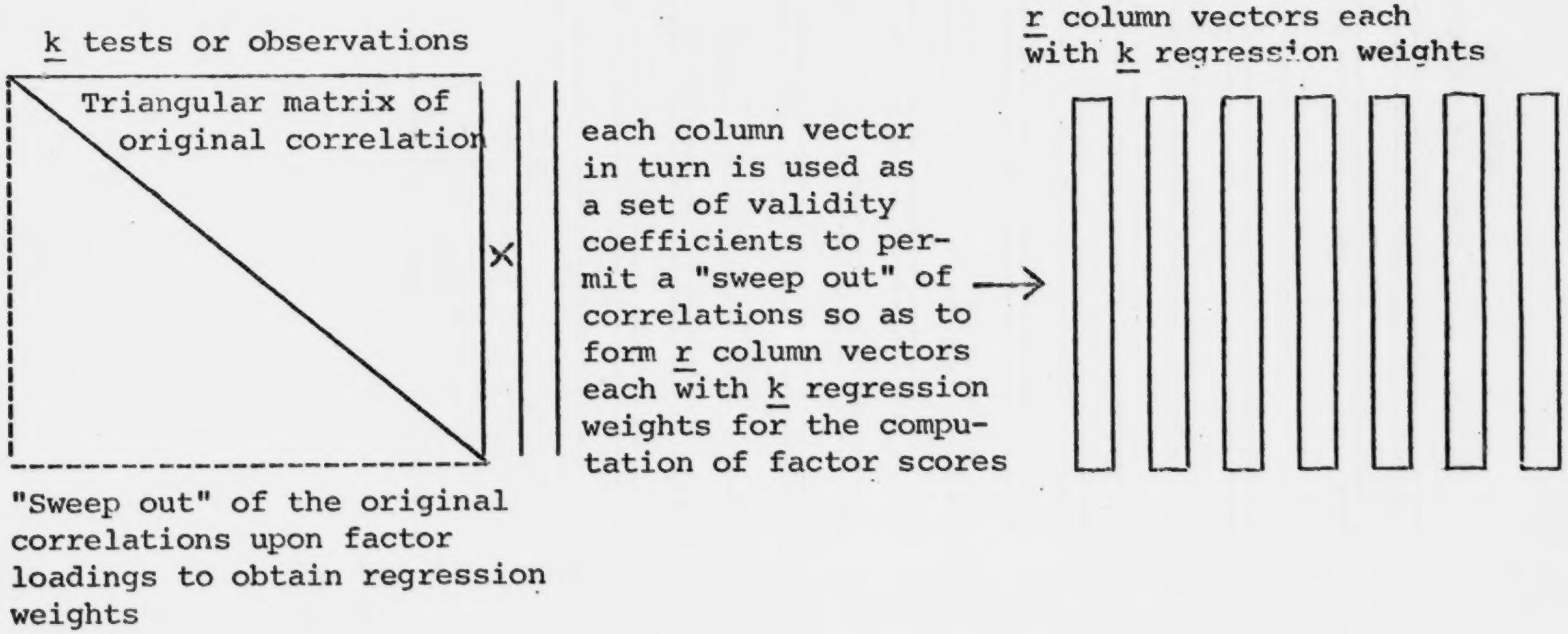
k tests or observations
Triangular matrix of original correlation
×
each column vector in turn is used as a set of validity coefficients to permit a "sweep out" of correlations so as to form r column vectors each with k regression weights for the computation of factor scores
r column vectors each with k regression weights
"Sweep out" of the original correlations upon factor loadings to obtain regression weights

Figure 1.02. Schematic diagram of operations to obtain k regression weights in each of r column vectors so that the weights represent the contribution of each of k observations to factor scores computed for N subjects.

teenth column headed "h^2" records the 87 *communalities*, that proportion of the variance each of the 87 variables has with each of the other 86 variables studied. The 87 by 87 intercorrelation matrix in Figure 1.01 (7,482 coefficients with 87 "1.00" values in the diagonal) was computed from the scores of 961 subjects on the 87 tests. The next step is to place each column vector in turn as "validity coefficients" next to the intercorrelation matrix and "sweep out" (Rao's term) the correlation coefficients upon the factor loadings. As shown in Table A.25 on page A-110, the outcome is a set of 15 column vectors each with regression weights for 87 tests as shown in Figure 1.02. These "optimal weights" are used to compute the factor scores for each subject using his set of scores to be multiplied by the weights. Table A.27 on page A-112 show that when the 15 factor scores for each of the 961 seniors were computed and intercorrelated, the gestalten representing configurations of positively and negatively regarded as "talented behaviors" in the year of graduation, the correlation coefficients are minimal. Thus the 15 "gestalten" of criterion variables are independent of one another. Descriptions of the several categories of talented behavior identified by the foregoing operations may be found on pages 2-2 to 2-8 of Chapter II with the salient tests contributing to each gestalt of talented behavior summarized in Table 2.01, pages 2-3 to 2-6 inclusive.

Dimensions of Antecedent Behavior Postulated as Gestalten in School Settings

Our HTRP and Textown studies suggest that there are at least three separate aspects of intellectual functioning. One of them is *divergent thinking*--the acquired ability to think of objects, persons, and ideas in new ways--the catalytic process which is the basis of what we mean by creativity. Secondly, all aspects of intelligent behavior--especially creativity or talented behavior--appear to be influenced in unexpected ways by the dynamic elements of our personality makeups which shape our values and attitudes. Not the least important of these is the *alienation syndrome* (mistrust, loneliness, pervading anxiety, resentment, pessimism, and self-centeredness). These hidden elements of an unhealthy emotionality may appear not only in antisocial attitudes, often marked by withdrawal or aggressive behavior, but also in lowered intellectual performances. In the third place, the ways in which young people show response to pressures placed upon them--by parents, peers, and more remote cultural agents in schools, colleges, and other settings--have much to do with both intellectual functioning and mental health. The individual who reacts as an effective person--gaining acceptance and maintaining independent action rather than being passively conforming--not only achieves academically and professionally, but also usually turns out to be a healthy human being. At least three dimensions of intelligent behavior reappear again and again in our computer analyses of the many kinds of tests administered.

1. Convergent Thinking. This is the ability to give the appropriate response, to acquire habits of thought and action that are most acceptable within a culture or subculture--for example, lower class as compared with middle class value systems (McGuire & White, 1957). Measures of performances on tests of intelligence, abstract reasoning, space relations, as well as the ability to listen all combine to yield this "factor in persons."

2. Divergent Thinking. Some, more than others, develop or acquire capabilities to devise new forms, come up with fresh ideas, and see deeper meanings in objects, events, interpersonal relationships, and symbolic materials. Measures such as identifying unforseen consequences, seeing unusual uses or problems, and sensing new meanings in common situations now are used to identify aspects of creative behavior. Although some teachers and parents value this catalytic element of creativity in children and adolescents, many are uncomfortable with such behaviors and prefer a degree of conformity (Getzels & Jackson, 1960).

3. Symbol Aptitude. Through familiarity with books and having stories read to them, middle class children acquire the ability to recognize verbal and printed symbols rather early. Only among underprivileged lower class boys and girls who stay in school only until the ninth grade does this "factor in persons" appear as a common attribute (Duke & McGuire, 1961). Recognition of mutilated words, identification of short words, and ability to make rhymes are three means used to measure aptitude with symbols.

These three "factors in persons," representing relatively independent elements of intelligent behavior, can now be measured with scores from a limited number of tests whose weights are computer-determined. Then three composite "factor scores" for each individual may be obtained as the next step. But there seems to be another dimension, evaluated adaptivity, which is not as yet directly measurable. Three lines of evidence bear out this proposition. In their sociometric assessments of one another, adolescents clearly respect behavior that is characterized by intelligent action (Peck & Galliani, 1962). Four experienced judges of human behavior, in assessments of projective and self-report data from over 100 college students, have each identified a factor of creatively intelligent autonomy (Veldman, Peck, & McGuire, 1961). Finally, an analysis of the HTRP data show a pertinent "factor in persons" derived from ninth-grade valuations:

4. Evaluated Adaptivity. Persons high in values for this "factor in persons" are regarded by their peers as individuals "who try to do all kinds of difficult things quickly and well" (work effectively). Moreover, they are regarded as "sort of brains," they "have a lot of ability in dealing with words" (verbal), and "put lots of effort into everything they have to do and keep working until successful or realize that things can't be done" (avoid failure).

The many kinds of personality instruments and attitudes scales that were administered to the same ninth-grade boys and girls yield only three "factors in persons." Of these, a dimension that corresponds to the alientaiton syndrome (Davids, 1955) seems to interfere with efficient cognitive processes. The earlier findings in the prediction of talented behavior (McGuire, 1961a) indicate that antisocial attitudes are often associated with lowered academic achievement. This is more evident in the areas involving language and communication than in science and mathematical thinking. In the ninth grade, however, the alienation syndrome appears to have a greater impact either on academic attainment or on the appearance of talented behavior or creative production than do the other two aspects of emotionality--sensitive conformity and personal stability.

5. Alienation Syndrome. Mistrust, pessimism, loneliness, resentment, anxiety, and self-centeredness are revealed in responses to a number of instruments and scales. The most effective combination of self reports are those wherein the boy or girl favors statements such as "strict discipline develops a fine strong character" (Authoritarian Discipline), "teen-agers gossip too much about one another" (Criticism of Youth), and "when you get right down to it no one is going to care much what is going to happen to you" (Negative Orienation to Society). Whether or not the alienation syndrome inhibits the catalytic element of creativity, measured in terms of divergent thinking, depends upon the area of behavior and complex interactions with other "factors in persons" which we have not as yet untangled.

6. Sensitive Conformity. Persons high on this dimension respond in way indicative of emotional sensitivity rather than being toughminded, of anxiety about achievements expected of them, and of acceptance of school and cultural standards. On the other hand, such individuals are low in aggressive impulses and are neither dominant nor competetive.

7. Personal Stability. Boys and girls high on this "factor in persons" respond negatively to statements like "sometimes I feel things are not real" (Personal Maladjustment), "I don't feel sure how to act on dates" (Social Inadequacy), and "I sometimes feel nervous and ill at ease" (CMAS Anxiety).

Being accepted by age-mates, as well as recognized and respected as an effective person, apparently leads to freedom of emotional expression. Those who are neither accepted nor respected--who are set back repeatedly by disapproval of elders as well as by rejection or isolation from their peers--frequently acquire feelings of alienation. In general they do less well than expected in school. Moreover, they less often show the kinds of culturally valued behavior termed talented. Academic achievement and signs of creativity are also inhibited by the development of antiacademic attitudes.

On the other hand, a quiet, dependent boy or girl who does not acquire an antisocial outlook may be quite successful scholastically. This is most often true, at least in the judgment of many teachers, when he or she conforms and does what is expected. All too frequently, some teachers (and college professors) expect memorization of facts and "regurgitation" of recalled information at examination time. The preferred alternative, of course, is mastery of underlying principles or "generic learning" wherein the learner grasps the structure of what is being taught (Bruner, 1961b).

Each of the foregoing additional "factors in persons" appears when age-mates are asked to evaluate one another in terms of sociometric nominations. For example, in our recent analyses of some 50 kinds of such evaluations among boys and girls in the ninth grades of four Texas cities, the computer programs grouped together the three over-all attributes in addition to what has been described as "evaluated apativity" above.

8. Peer Acceptance. Individuals with high "factor scores" for this dimension most frequently are nominated as "the ones to be with" (Peer Affiliation), "a person I would like to be like" (Behavior Model), and "persons who enjoy everything they do and welcome the chance to do new things" (Outgoing Optimism). These boys and girls, however, do not necessarily "see things to do and go ahead and do them on their own initiative" (Personal Initiative).

9. Antiacademic Attitude. The young people who are evaluated as having this underlying attribute most often are named as persons one would "not ask for help on a school problem" (Negative Academic Model). They are reputed to "find schoolwork a disagreeable chore and resent any kind of study" (Dislikes School) as well as "do enough to get by but resent doing anything extra" (Gets By). Moreover, such individuals frequently are nominated as one "you might not prefer to be with" (Peer Rejection) and "not like to be like" (Negative Behavior Model).

10. Quiet Dependency. For this underlying element of agemate assessments, three sociometric descriptions cluster together. Persons generally regarded as high in the attribute are "sort of quiet and they're often forgotten or just not noticed" (Quiet Ones), "left out of things and often make other people feel uncomfortable" (Isolated Ones), and "depend upon their parents or other older people for advice and look to them for approval" (Adult Oriented).

The ten gestalten, or underlying dimensions of human behavior, have been extracted and the data processed by electronic computer to "boil down" large masses of data on many boys and girls. As indicated in the foregoing descriptions, the data range from different kinds of performances on intellectual tests to various kinds of self reports indicative of emotionality and attitudes, and to appraisals of one another made by age-mates. The factors summarized here have been derived from analyses of data gathered in the ninth grade from boys and girls in four participating school systems. Nevertheless, they bear a striking resemblance to the "factor variables" developed in the seventh grade to predict various kinds of talented behavior in grade nine (McGuire, 1961a).

In some cases, school people are undertaking something out of the ordinary to provide new kinds of learning opportunities. Our hope is that modifications in school organization and in teaching--especially those directed to encourage divergent thinking as a catalyst of creativity and to reduce the alienation syndrome as well as antiacademic attitudes--will "upset" our predictions in such instances. Then we shall have evidence that something can be done to encourage talented behavior and individual mental health.

The Dyadic Interaction Model

The dyadic interaction model, mentioned a number of times earlier in this chapter and diagrammed schematically in Figure 1.03, may be traced back to Sears (1951) and the influence of Tolman (in Parsons & Shils, 1951, p. 281-359), both of whom McGuire encountered at Chicago when the two men were planning to join Parsons and Shils at Harvard to formulate what became Toward a General Theory of Action (1951) Subsequently McGuire worked out what his students christened a "Context Theory," superimposed upon the title page of the article wherein it was developed as Figure 1.04, p. 1-27, with ideas from "Human Learning in the N-Person Context" (1953), the appropriate reference being given in Appendix D, page D-4.

The dyadic model follows from assumptions implicit in the views of present-day students of human behavior; for example, Piaget (1961, 1966, 1967), Bruner (1964, 1965). The three assumptions are: (a) the cortical substrate of any relatively biologically intact (biointact) human organism has a preference for order--hence the organization of "central processes" and their re-organization through experiences, (b) becoming a human being is a function of the nature and quality of reciprocal stimulation encountered in dyadic and polyadic Alpha-Beta interactions--hence the development of emotionality (McGuire, 1960) and self awareness (Hebb, 1960; McGuire, 1953), and (c) all observable behavior of a human being ultimately is evaluated either in comparison with one's own self expectancies of cultural agents (Betas in Figure 1.03)--Alpha learns to behave in terms of expectancies about the supportive or nonsupportive responses of significant Betas (Sears, 1951) and modifies his ongoing behavior according to the feedback he experiences (see footnote 4 on page 1-5).

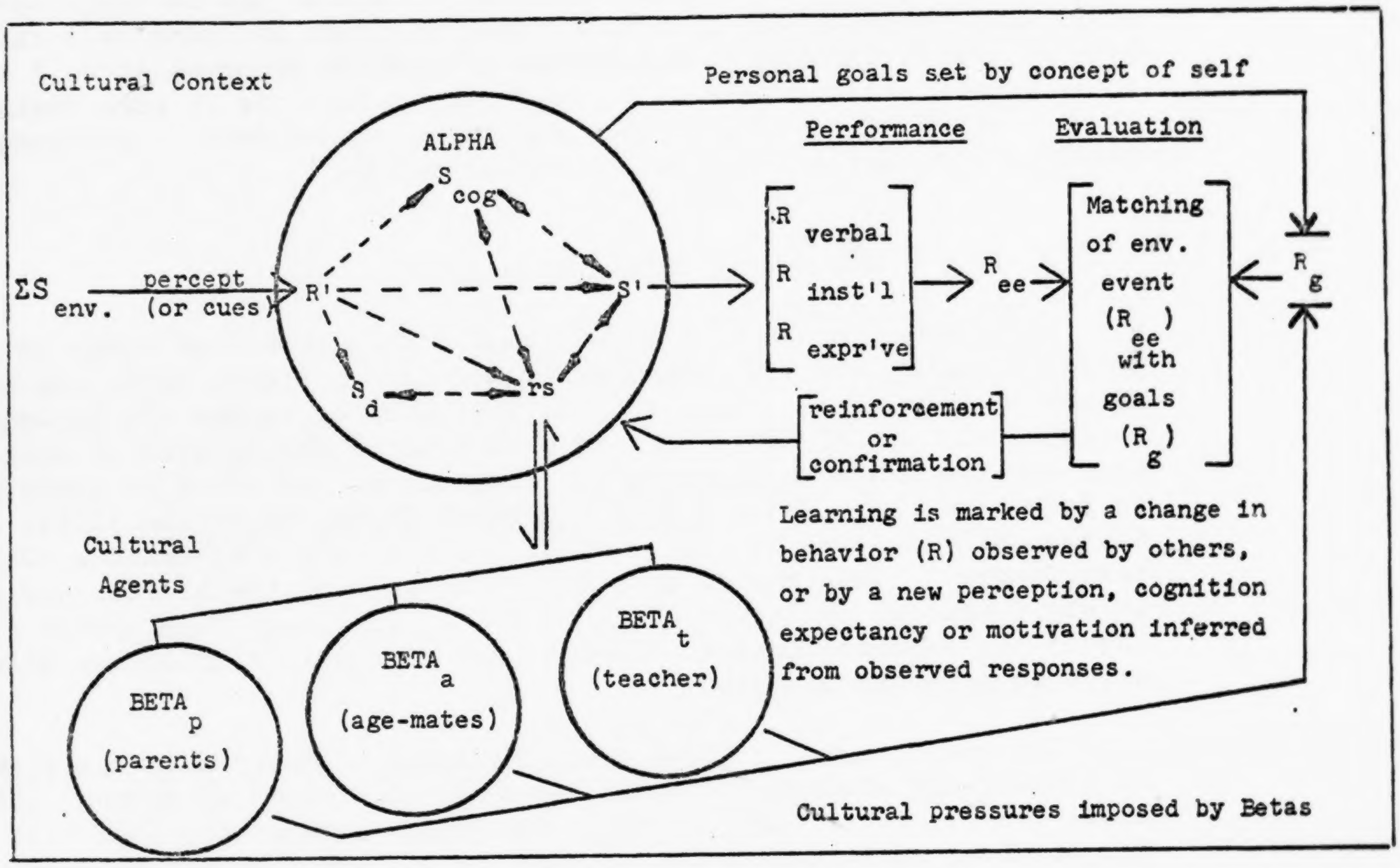
Cultural Context
Personal goals set by concept of self
ALPHA
S cog
R'
S'
S d
rs
ΣS env.
percept
(or cues)
Performance
Evaluation
R verbal
R inst'l
R expr've
R ee
Matching of env. event (R ee) with goals (R g)
R g
reinforcement or confirmation
Learning is marked by a change in behavior (R) observed by others, or by a new perception, cognition expectancy or motivation inferred from observed responses.
Cultural Agents
BETA p (parents)
BETA a (age-mates)
BETA t (teacher)
Cultural pressures imposed by Betas

Figure 1.03 Dyadic interaction model for the study of human development and behavior.

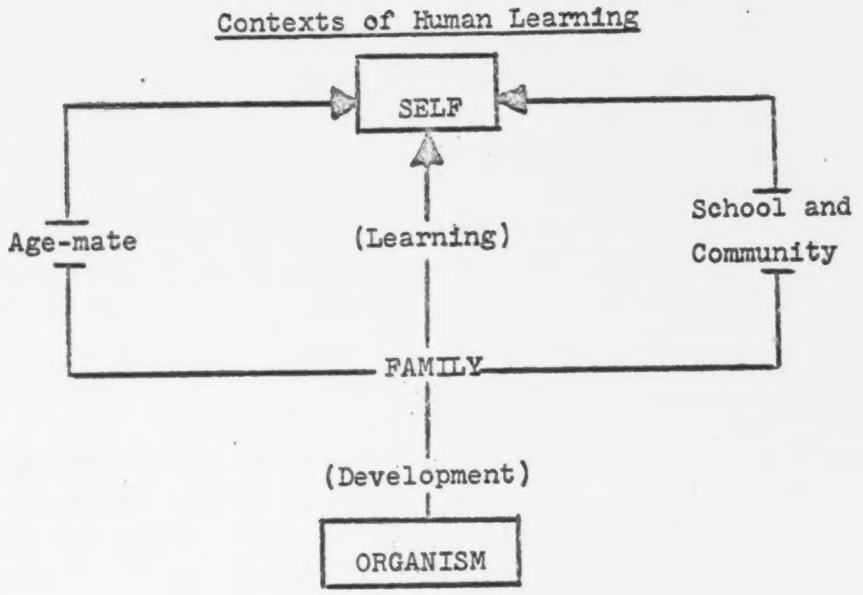
Contexts of Human Learning
SELF
Age-mate
(Learning)
School and
Community
FAMILY
(Development)
ORGANISM

Figure 1.04. Contexts of development, social learning and self awareness.

The Dyadic Model and the Development of Intelligent Behavior

A set of theoretical principles regarding the development of intelligent behavior have been arrived at by means of a convergent analysis of available theories (Rowland & McGuire, 1968b). The organization of central processes which underlie the development of intelligent behavior rests upon an assumption that there exists a biological capability and necessity for the learning organism to interact with one or a combination of the genetic, internal, or external environments. Figure 1.03 should be regarded as a heuristic representation of the psychological processes common to all human experience, including the reciprocal stimulation which initiates the organization of central processes, their control of impulses, and their relation to emotionality (McGuire, 1960), as well as social learning wherein Betas are models for imitative identification. These processes are conceived to be an invariant sequence which is culminated with the development of intelligent behavior, beginning with interaction from which the organism gains experience, and the acquisition of experience results in the development of the central processes of control. These central processes serve to guide or inhibit the organism's attempts to extend its control over the inevitable and incidental encounters with the external environment.

The Cultural Context of Learning

Human learning and ongoing behavior both take place in cultural contexts which involve not only the learner (Alpha), or actor, but also cultural agents (Betas) such as parents, peers, and teachers. The schema in Figure 1.03 turns out to be a valuable representation of the educational encounter wherein cognitive restructuring ($S_{cog} \longrightarrow S'_{cog}$), attitude change ($rs \longrightarrow rs'$), and behavior modification ($R_{ee} \longrightarrow R'_{ee}$) are instances of learning. Each person brings into the behavior setting (such as a classroom, a CAI terminal, or a group around a table) the ability to perceive stimuli, $S \relbar\!(\!\!\rightarrow R'$, as well as the energy to respond in the form of motivations or a drive structure (S_d). Drives may be conceived as needs, epistemic curiosity, or emotional arousal in the reticular activation system (RAS). The person also brings the residuals of prior experiences (schema in Piagetian terms, S_{cog} or cognitive structure, or cognitive map in Tolmanian terms), and the capacity to respond expressively, instrumentally and verbally to mediated cues, $S' \relbar\!)\!\!\rightarrow R$. The learner already has acquired certain habit patterns ($S \longrightarrow R' \longrightarrow S' \longrightarrow R$) which reduce the amount of necessary mediation ($R' :: S'$). Each learner has acquired and is cued by expectancies (rs_p, rs_t, rs_a) of the supportive or non-supportive behavior of the cultural agents. These expectancies sometimes are studied as attitudes. Briefly then, learning involves changes in the perception of stimuli, the drive structure, the cognitive structures, the expectancies, and habit patterns. If learning is marked by observed shifts (modifications) in performances where expressive, instrumental, and verbal responses summate into environmental events or abserved sequences of behavior (R_{ee}). Goals (R_g) are set by the learner and/or by the pressures of cultural agents. When expectations are confirmed by the matching of a response, or performance, with goals, there is reinforcement of learning (Alpha encounters confirming or positive feedback); when contradicted (Alpha encounters non-confirming or negative feedback) there is either a redirection of behavior, or forms of inhibition and extinction are observed.

The model proposed in Figure 1.03 is structured with "empty synbols" so that behavioral scientists of different orientations may impose their own conceptions. The model is not considered as "closed" or complete, nor is the theory which accompanies it finished. Rather, both the model and the theory are open to refinement without loss of explanatory power by either.

Some Principles Common to Intelligent, Talented, and Creative Behavior

Within the theoretical content proposed, a set of sequential principles has been defined to be relevant to the development of intellignet behavior in all its multiple facets, including response capabilities evaluated as talented or creative behavior. These principles are considered to be sequentially prerequisite to the achievement of intelligent, talented, and creative behavior.

Interaction occurs during any process of organism-environment(s) feedback by means of which the organism directs, defines, redirects or redefines the environment(s) and its own behaviors according to a learned frame of reference. Each interactive experience serves additionally to differentiate the organism from the environment by means of change, both as the transformations within the organism and as alterations of the environment(s) being interacted with. In addition, each interactive episode provides the learner with experience or experiential information by means of which the central processes ultimately are developed and control of one's own behavior is extended.

Experience is the relationship of familiarity between the organism and its three interacting environments; namely, biological heredity, one's self, and a social heritage (represented by cultural agents). Also, please refer to footnote 4 on page 1-4.

The central processes of control result from reciprocal stimulation as well as the organization and integration of informational feedback in such a way as to be accessible for retrieval upon organismic or environmental demand. For example, the "empty symbols" depicted within Alpha could be regarded as a reverbatory circuit involving cue-producing responses (R'), an arousal system (S_d), expectancies or attitudes (rs), cognitive schema (S_{cog}), and foresight or "feedforward" (S'). Self instigation of intelligent behavior could be initiated at almost any point in the dynamic organization. Central processes are of crucial importance when inevitable human encounters.[6]

The Continuity-Discontinuity Principle

The invariant sequence, which begins with reciprocal stimulation, continues with interaction, and culminates in intelligent behavior, operates according to the principle of feedback as developed in the theories which evolved from Weiner's pioneer work in cybernetics (1949). In this conceptualization, which incidentally is quite compatible with Piaget's thinking with one major exception regarding the objective of equilibration,[7] the learner initiates a primary behavior. Upon receiving negative or non-confirming feedback, a secondary or accommodative behavior is initiated. Positive or confirming feedback results in no change and the continuance of assimilatory behavior. Using these notions, education may be understood as the controlled introduction of discontinuity into the environmental interactions of learners.

Transformations of the Dyadic Interaction Model for the Study of Talented Behavior

The identification of potential factors in persons had led us to think and to theorize in terms of classes or categories of variables which interact, or operate jointly, to underly observed behavior as well as inferred attributes of human beings. What has been termed a "dimensional model" or theory for studying talented and other forms of human behavior has emerged from the kinds of research experiences outlined above.

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[6] Every person faces a series of inevitable human encounters posed by his biological nature and the institutions necessary to regulate the behavior of man; for example, the transition from infancy to a near autonomous child, puberty and the change in body image, sex-typed expectations in the age-mate and adult societies, marriage and the "prime human encounter" which creates and "brings up" each individual replacement, then later maturity and death.

[7] The strongest justification for altering the objective of equilibration is to avoid the logical embarrassments of traditional homeostatic models. The refined objective is that the organism actively seeks stimulation or discontinuity. This stimulation-seeking organism then would not find pleasure in a state of balance or inertia, that is, the state of achieved equilibrium. Instead, within this context, the learning and behaving organism remains in a constant state of dynamic and reciprocal interaction.

When theory suggests that a certain class of behavior should have demonstratable effects in terms of a criterion, and when statistical methodologies yield results which are statistically (though not necessarily practically) significant, perhaps more effort should be devoted to refining the measures of the class of behavior in question. For example, our theory suggests that an individual's measured behavior on a criterion should be affected by the pressures imposed by peers. We used nomination-type devices to tap this pressure. Results from factor analysis suggest that these measures are statistically independent of certain other measures. Regression analyses show that such measures do in fact increase prediction significantly in a statistical sense. The increase, however, is so meagre in absolute terms when combined with other measures that their usefulness is questioned. The point is that some better measure of peer pressures might be developed which would be of theoretical interest and practical usefulness.

The Dimensional Model

In his clearly-written book on The Conduct of Inquiry: Methodology for Behavioral Science, Kaplan (1964, pp. 325-26) succinctly put into words the problem we faced in the Human Talent Research Program with regard to theorizing and model-building:

> In the present state of our knowledge, human behavior is often seen as the outcome of the joint working of a number of distinct and often unrelated factors, as in the choice of a mate, or in the outbreak of war between nations. Consequently, two-variable causal laws are often inadequate, and important magnitudes are not scalable. In a sense, we know too much to be able to unify it in a single theory, and we do not know any of it with sufficient sureness. The problem of combining factors is not automatically solved by formulating the combination in terms of a field theory......we need to know, not only the separate factors that are determinative of behavior, but also how they interact with one another. It is not always possible to advance step by step; to arrive at a good theory may call for as much boldness as imagination.

A model provides a way of structuring our conceptions and mapping observations so that both concepts and data become ordered and meaningful. Models usually show some correspondence to theories that have variables which make sense out of what is being studied. Each element or variable in a theory and corresponding model can be understood in terms of its place in a network of relations forming what Kaplan (1964, pp. 332-333) designates as a pattern model. These models appear to be most useful when there is some correspondence between them and a mathematical formulation which permits the ordering and manipulation of data to test the probable validity of explanations and predictions.

Our HTRP studies have been guided by what has been termed as a "context" theory of personality formation and functioning (McGuire, 1953). Linked with theory, we have employed a basic model (McGuire, 1961) which structurally is isomorphic to theoretical dimensions of human behavior, whether it be talented or not, and to the elements of applied multiple linear regression as a mathematical counterpart (Bottenberg and Ward, 1963).

Talent is an English word which stems from the Latin talentum (an ancient money weight or unit) and the Greek talanton (a balance, a thing weighed). Thus the word "talent" implies something of worth and an act of evaluation. Talented behavior usually is regarded as the product of a pre-eminent aptitude or a superior ability, either natural or acquired, as well as a recognized capacity for achievement or success.

Cross-cultural comparisons clearly demonstrate that human beings are not limited to possessing a predetermined set of talents. In two papers, the second a cogent analysis of ability, George A. Ferguson (1954, 1956) argues that a particular cultural group valuing certain kinds of ability emphasizes the development of appropriate kinds of evaluated abilities. In general, preferred competencies tend to be overlearned and to attain "a crude stability or invariance." Then the invariants in observable behavior often are regarded as abilities to be evaluated in terms of performances. By and large, such abilities often are regarded as inherent and characteristic of the person and subculture from which he or she comes. Only when someone does something out of the ordinary to alter patterns of learning, as in an educational telesis (McGuire, 1961) or as a consequence of some intervention (McGuire, 1964) does the acquired habit pattern have an opportunity to change.

Basic Model and Dimensions of Talented Behavior

Figure 1.05, pp. 1-27 (McGuire, 1961) sets forth our initial diagram of a model for research in human talents. Contextually, the model has provisions for learning in accord with the sex-role expectations of different communities. Since each community has age-graded societies with value standards and patterns of acceptance,

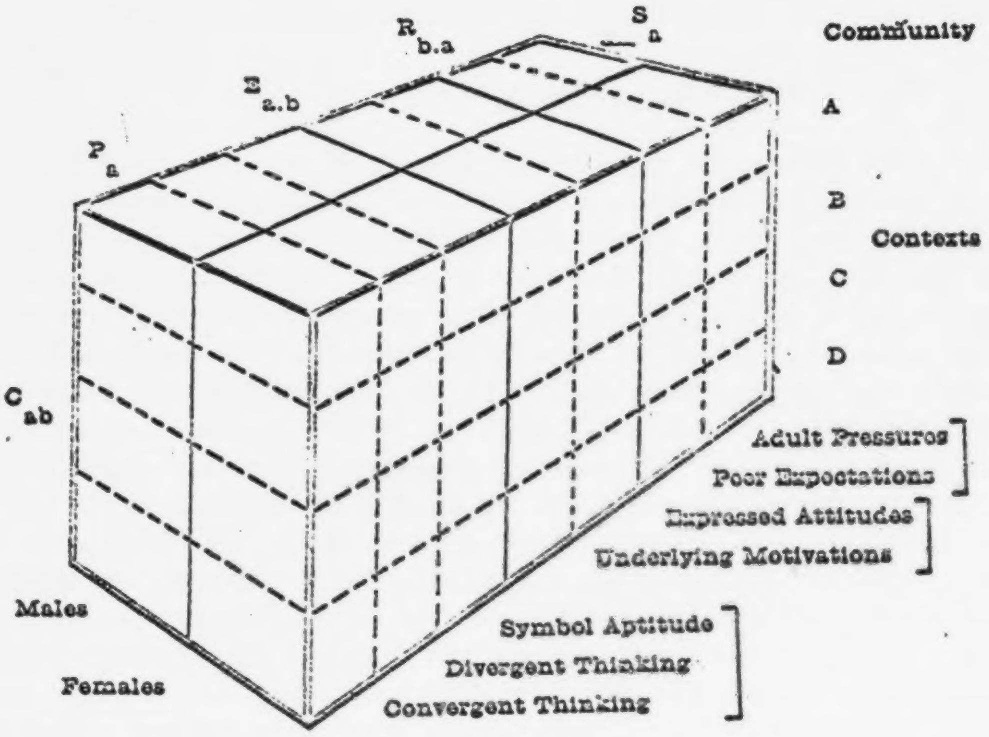
$R_{b.a}$
S_a
Community
$E_{a.b}$
A
P_a
B
Contexts
C
D
C_{ab}
Adult Pressures
Peer Expectations
Expressed Attitudes
Underlying Motivations
Males
Symbol Aptitude
Divergent Thinking
Females
Convergent Thinking

Fig. 1. Schematic diagram of a model for research in human talent.

$$B_a = f(P_a, E_{a.b}, R_{b.a}), S_a, C_{ab}$$

B_a = behavior of the person (a) to be explained or predicted;

P_a = potential cognitive, perceptual, and other relevant abilities;

$E_{a.b}$ = elements of personality and motivation, especially expectations about one's own behavior and probable responses of other persons;

$R_{b.a}$ = responses of other persons (b) expressed in terms of their expectations and pressures they impose upon the given individual (a).

S_a = sex-role identification of the individual (a) and sex-typing of socialization pressures, both moderating preceding variables;

C_{ab} = context of behavior, such as a community or school setting which provides an institutional framework along with certain experiences and impersonal expectations; or, the setting in which a natural or a laboratory experiment takes place.

Figure 1.05 An antecedent schematic diagram and mathematical formulation of a model for research in talented behavior (McGuire, 1961).

avoidance, and rejection by one's peers, these phenomena are theoretically relevant. For translation into mathematical terms, the model may be written in an metamathematical form

$$B_a = f(P_a, E_{a.b}, R_{b.a}), S_a, G_a, C_{ab}.$$

The notation indicates the debt we owe to Sears (1951) and his presentation of a theoretical framework for personality and social behavior. Here the subscript "a" denotes Alpha, the learner, or particular subject(s) of study. Similarly, since the model reflects a dyadic instead of a monadic theory, "b" represents Beta, the cultural agent(s) (parents, peers, teacher) who influence the Actor (a) being studied. The major dimensions sometimes are studied as "factors in persons" and, at other times, as subsets of measures which are most effective in representing the elements of the model. Talented behavior (B_a) is regarded as behavior of the person (a) to be explained or predicted, particularly abilities or talents such as academic achievement, artistic, or musical or dramatic ability, athletic prowess, verbal fluency, scientific curiosity and capability, or qualities of leadership valued by present-day middle-class Americans whose value-standards dominate secondary schools in America. Thus, the model expresses the underlying theory that talented behavior is a function (f) of

P_a = potential cognitive, perceptual, and other relevant abilities characteristic of a person at a given time.

$E_{a.b}$ = elements of personality and motivation, sometimes labeled needs or attitudes, particularly expectations about one's own behavior (a) and probable responses of other persons (b) to it.

$R_{b.a}$ = responses of other persons (b) expressed in terms of their expectations, or sociometric valuations, and pressures they impose upon the individual (a), sometimes termed stress and/or anxiety.

Potential abilities, attitudes or expectation, and stress tolerance probably are influenced as a consequence of:

S_a = sex-role identification and the sex-typing of socialization pressures upon males and females.

G_a = age-mate acceptance and degree of agreement with the value standards held by members of one's generation.

$C_{a.b}$ = the context of behavior, especially the varying patterns of educational experiences and role expectations in different school locations. Within communities those who are culturally deprived may be identified in terms of social-class indices, ethnic group, and/or color-caste categories.

Mathematical Formulation

Fortunately, the availability of a high speed computer (CDC 1604) made possible the application of multiple linear regression theory in a form wherein observed data paralleled the model. As a consequence of this isomorphism, hypothesis testing stemming from the theory could be carried out. Appendix B provides an introductory account of ways in which various kinds of problems may be formulated and hypotheses may be tested by applying a general regression approach.

For example, suppose we have a hypothesis which asserts that some subset of predictors representing the components of the model in parenthesis can be employed effectively to predict academic achievement, a talent valued by teachers, most parents, and a substantial proportion of students. Further, suppose we want to know whether or not inclusion of categorization by sex or classification by community yields a more effective explanation. In addition, provision is made to test the value of nomination data compared with self-reports in terms of predictive value.

The full multiple-regression model corresponding to all elements of the dimensional model then could be written:

$$Y = a_0U + a_1X_1 + a_2X_2 + a_3X_3 + \dots + a_9X_9 + e$$

Y = the criterion, GPA, grade-point average in high school;

where

$a_0, a_1, a_2, \dots a_9$ = regression weights (to be obtained);

U = the unit vector (a "1" for each subject) to be assigned a regression weight which adjusts the mean of the expression to the right of the equality sign to be equal to the mean of the criterion;

X_1 = CTMM Mental Function, representing P_a being an index of quality of convergent thinking;

X_2 = SSHA (Study Habits and Attitudes) representing $E_{a.b}$ or scholastic motivation;

X_3 = Nominations as in Academic Model, to represent $R_{b.a}$ or stress tolerance;

X_4 = Negative Social Orientation, to denote $R_{b.a}$ or reactions to social pressures and cultural expectations;

X_5 = "1" if the subject is female; "0" otherwise (i.e., male), for S_a, reflecting sex-typed differences;

X_6 = "1" if subject is in Ashton, "0" otherwise, for $C_{a.b}$, representing the community contexts;

X_7 = "1" if subject is in Bandana, "0" otherwise;

X_8 = "1" if subject is in Centerville, "0" otherwise;

X_9 = "1" if subject is in Duneside, "0" otherwise;

e = error term.

As explained in Appendix B the initial step requires computation of the intercorrelations of the nine variables with one another, in terms of Grade IX values, and each with the criterion Y or GPA values at the end of Grade XII in high school. The matrix of intercorrelations and correlations with the criterion form the basic prediction matrix and criterion vector, respectively, permitting multiple linear regression analysis. The solution of tne system of equations derived from the intercorrelation matrix and the criterion vector provides regression weights and the square of the multiple correlation coefficient $(MCC)^2$.

To test the hypothesis that a nomination variable (e.g., Academic Model, X_3) . is contributing significantly to the reduction of predictive error in the presence of the other independent variables of the model above in predicting teacher evaluations in the form of GPA (Y) restricted models are written. Solutions can be obtained for the instance when the weight for X_3 (or some other variable) is postulated to be zero. Then $(MCC)^2$'s for the restricted models may be compared with the unrestricted or full model $(MCC)^2$, employing the F-test discribed in Appendix B to infer which variable, if any, may be eliminated from the set without reducing predictive efficiency to any significant extent. As outlined in Appendix B, the same basic data permit the equivalent of analyses of variance to determine whether or not sex role, location, or an interaction of the two are actually significant sources of variation in academic talent. Moreover cross-validation studies are possible.

The point we want to make is that applied multiple regression permits an isomorphic relation among data, a model, and an underlying theory. Moreover, a range of problems can be formulated for the testing of hypotheses to support or discredit the explanations that have been advanced.

The Catalytic Model

The idea of a "catalytic vector," stemming from Spector's dissertation (1963), and confirmed in Whiteside's doctoral research (1964), supplies a construct to "account for" changes in the operation of one variable upon another from one level to another. The *dimensional model* becomes the *catalytic model*:

$$B_a = f\ C_v(P_a, E_{a.b}, R_{b.a}), S_a, G_a, C_{ab}$$

where C_v is the "catalytic vector" which is postulated to interact with *one or more* of the elements in parentheses so as to *facilitate* or to *inhibit* the operation of a variable.

At least three kinds of catalytic elements influencing change may be conceived:

(a) *Physiological changes*, such as those which occur during the maturation of girls and boys, which precipitate new developmental tasks; namely, (i) accepting a new body-image, made necessary by rapid increases in height and weight as well as the appearance of secondary sex characteristics; (ii) incorporating fresh norms of masculinity and femininity; (iii) fitting into an emerging adolescent society wherein age-mates of both sexes shape the peer cultures and value-attitudes which govern much of teenage behavior (McGuire, 1956); (iv) beginning the process of "psychological weaning," or the tendency toward independence (emancipation) on the part of adolescents in relation to adults. Thus significant changes in the bio-social status of boys and girls during the junior high school years require extensive reorganization of the personality (Ausubel, 1954) or, alternatively, the re-formation of the ego (Sherif & Cantril, 1947, pp. 199-279). For a relatively small proportion of "late-maturing" boys, however, these bio-social-psychological changes may be postponed until the interim between the ninth and tenth grade, or the tenth-grade year itself.

(b) *Intervention* (McGuire, 1964), in the sense of deliberately interposing a number of planned learning opportunities into the usual pattern of classroom and/or counseling experiences. In the HTRP, the original term was *telesis* (McGuire, 1961) indicating that something out of the ordinary has been done in guiding learning experiences to *upset* the "crude kind of stability or invariance which makes (behavior) predictable" (p. 83).

(c) *Factors in persons* which interact with, and thus modify, the potential abilities (P_a), the expectations and attitudes ($E_{a.b}$), *or* the stress tolerance ($E_{b.a}$) of human beings.

A number of such factors have been postulated. Some have been tested and found valuable in prediction studies. In his doctoral dissertation, Spector (1963) has evidence to show that the factor variable divergent thinking probably modifies such abilities as convergent thinking (usually indexed by a test of intelligence) and thus accounts for behavior that ultimately is evaluated as relatively rare, yet reality-oriented and not bizarre, but reproducible. Thus the creative talents, so effectively described by McKinnon (1962) are regarded as the resultant of a process wherein divergent or productive thinking is a dimension of intellectual behavior which acts as a catalyst to steer or drive a person to employ his abilities, to acquire new kinds of expectations, and to cope with pressures and learning opportunities which may impenge upon him or her. Similarly, in his dissertation which provides the substance of Chapter III, Whiteside (1964) clearly has shown that "impulsivity vs. impulse-control" or "affectivity versus affective neutrality," indexed by scores for STEP Listening, has a modifying influence upon convergent thinking in so far as that ability may be indexed by CTMM Mental Function. Further, we anticipate the future work may demonstrate the ways in which an alienation syndrome (Davids, 1955) modifies cognitive styles, expectations and the capacity to cope with stress over a period of time.

Mathematical Formulation of the Catalytic Model

Suppose we reason that the bio-social changes marked by the adolescent "growth spurt" and the appearance of secondary sex characteristics should be different for boys and for girls. This would be a reasonable approach since girls, on the average, tend to mature earlier than boys and a small number of males do not experience the physiological changes until the transition from ninth to tenth grades. Further, let us decide to test the hypothesis that impulsivity modifies intellectual functioning over the junior high school years.

The full multiple-regression model corresponding to elements of the catalytic model then may be written:

$$Y = a_0U + a_1X_c.X_1 + a_2X_2 + a_3X_3 + \ldots + a_kX_k + e$$

where each element is defined as in the earlier full model, a_9X_9 becomes a_kX_k (indicating that k-1 variables have been introduced) and

X_c = a catalytic vector made up of scores of subjects on STEP Listening as an index of the "impulsivity" which acts upon the initial intellectual ability, X_2, to modify its influence at a subsequent time.

In practice, computer programs accept entries of "1" for boys, "0" for girls. Moreover, only unit entries are required for the communities X_6, X_7, and X_8 are necessary, since the ones with "0" for location have to be in Duneside.

Following the rationale in Appendix B, restricted models may be written and values computed to carry out tests of hypotheses about differences between the sex roles and among the four communities. Saunders (1956) has suggested the term "moderator variables" which may be viewed as equivalents of the "catalytic vectors" proposed herein. In Appendix B which is entitled "Methodology," pages B-5 to B-16 explain the use of multiple linear regression models to control contaminating variables statistically, using data derived from naturalistic observations instead of data from contrived experiments which usually "skeletonize" multi-variable phenomena. Pages B-11 to B-14 should be of particular interest to the reader concerned about "catalytic" effects or "moderator variables." The methodologies of factor analysis, employed extensively in Chapter II, and cross validation, a major concern of Chapter III, have been reviewed on pages B-16 through B-19.

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CHAPTER II

DIMENSIONS AND CRITERIA OF TALENTED BEHAVIOR

The Human Talent Research Program (HTRP) has employed a relatively simple operational definition of talent to distinguish the focus from what has been termed "creativity." If an individual's behavior or productivity is either socially or culturally valued, then the person so evaluated is talented. This chapter reports the results of inquiries into the nature of operational criteria of talented behavior at the point of high school graduation. In addition, some attention is paid to dimensional or predictor variables which may be employed to explain, and/or forecast, various kinds of talented behavior as evaluated at some subsequent time. To encompass the wealth of data, criteria and predictors were factor analyzed (Appendix B).

In addition to grade point average (GPA), three STEP tests (Science, Social Studies, and Mathematics), the School and College Aptitude Test (SCAT) were accepted as culturally-valued measures of academic performances among the 961 senior boys and girls in the twelfth grades of large senior high schools in four Texas communities. Moreover, using code numbers and mark-sensed IBM response cards, teachers nominated individuals fitting 47 brief descriptions of desirable behavior. To supplement adult evaluations, age-mates assessed one another in response to 25 peer-nomination items. Finally, each senior completed a form similar to one used for National Merit Scholarship candidates (Holland & Astin, 1961; Holland, 1962).

Method

The problem was to obtain a meaningful and parsimonious set of "factor variables" from the 87 criterion measures of "talent" among the 961 senior boys and girls. A program for the CDC 1604 computer yielded the required intercorrelation matrix, a principal-axis solution, and a varimax rotation (Kaiser, 1960) to maximize column factor loadings. With a cut-off point at eigen values of 1.0 or greater, fifteen meaningful "factors in persons" emerged. A similar procedure was employed to identify the factor variables in Grade IX to be used to predict the criterion factors in Grade XII. Basic data Tables A.21, A.22, and A.23 in Appendix A, pp. A-80 to A-107, supply details about the administration of instruments, distribution statistics, and degree of stability over time. The HTRP population by high school graduation included not only 800 who had participated since 1957-58 but also many who had transferred to the four communities before 1962-63.

Criterion and Predictor Factors

Table 2.01 sets forth the fifteen twelfth grade factor variables interpreted as underlying criteria of talented behavior. They appear to be implicit frames of reference for assessments upon high school graduation when teachers evaluate students, age-mates appraise one another, and graduating students represent themselves on self-report items employing criteria used to make selections for National Merit Scholarships (NMS). As illustrated in the table (which selects criterion components with factor loadings from Table A.24 and partial regression coefficients from Table A.25 of Appendix A), regression weights were obtained for criterion measures to estimate the relative importance of each measure in determining the nature of each of the 15 criterion factor variables. These beta weights usually are smaller than initial factor loadings since the regression weight represents the independent linear contribution of a component measure to a factor variable. To obtain a "factor score" for each subject, relevant weights for *all* 87 criterion measures were employed to compute the estimated values. As shown in Table A.26 of Appendix A, the factor variables representing the 15 talents are statistically independent from one another. Thus each subject could be assigned a "score" for each of the fifteen criterion factors representing categories of talented behavior, using beta weights from Table A.25.

Descriptions of Talented Behavior at High School Graduation

The descriptions of talented behavior in the twelfth-grade year (1962-63) of the HTRP students in high schools in four Texas Communities have been derived from performances on standard instruments, self reports, teacher nominations, and pupil valuations of one another at the four locations. The descriptions have been derived from Table 2.01 which, in turn, was derived from an analysis of data in hand or "components analysis" (Harris, 1963, p. 139) summarized in Tables A.24 and A.25 of Appendix A. Reading through the fifteen criterion factors and their components persuades one that the criterion variables have face validity and represent underlying criteria of talent at the time of high school graduation.

C-1 *Productive Thinking*. Nominated by high school teachers as an individual who structures ideas meaningfully, is perceptive regarding problems others tend to skip over, copes successfully with his or her environment, exhibits problem-solving skills, is "truly creative," as well as talented in the social sciences. These persons seldom are among those who report themselves as having won a prize in art, or as writing an original scientific paper. Their age-mates do not tend to regard them as academic models, or

TABLE 2.01

Factor Loadings and Regression Weights of Appropriate Criterion Measures for 15 Factors Representing Talented Behavior Among High School Seniors (N = 961).

**denotes highest factor loading or regression weight for criterion measure

*denotes other significant loadings above .25 or weights of .10

Factor Variable	MFN	Criterion Measure	Factor Loading	Weight
I. Teacher-Evaluated Productive Thinking	698	T-NOM Meaningfully Structures Ideas	578**	311**
	699	T-NOM Perceptive re Problems	548**	262**
	701	T-NOM Copes with Environment	441**	246**
	693	T-NOM Operates Independently	327*	156*
	674	T-NOM Interpretive Arts	198	131*
	706	T-NOM Problem-Solving Skills	376*	129**
	707	T-NOM Truly Creative	333*	121*
	670	T-NOM Social Sciences	302*	117*
	635	NMS Won Prize(s) in Art	-135	-100*
	520	P-NOM Academic Model	-072	-105**
	548	P-NOM Math Ability	-009	-130*
	686	T-NOM Power Behind the Scenes	-151	-187**
	700	T-NOM Resourceful Use of Objects	-171	-205**
	644	NMS Original Scientific Paper	-269*	-247**
II. Peer-Evaluated Creative Effectiveness	656	P-NOM Effective Leader	888**	223**
	651	P-NOM Ideational Fluency	899**	218**
	522	P-NOM Creative Imagination	752**	126**
	517	P-NOM Works Effectively	682**	103**
	652	P-NOM Unusual Ideas	730**	102**
III. Academic Performance	605	STEP Social Studies	846**	261**
	603	STEP Science	809**	249**
	809	Coop SCAT (V + Q)	829**	246**
	606	STEP Mathematics	791**	243**
	811	12th Grade GPA	539*	142**
IV. Rhetorical Ability	634	NMS Publication(s)	581**	307**
	633	NMS Won Speech Contest(s)	630**	301**
	642	NMS Creative Writing	552**	284**
	694	T-NOM Writes with Appeal	461**	186*
	641	NMS Lead in H.S. or Church Play	344**	151**
	674	T-NOM Interpretive Arts	202	134*
	646	NMS Made Scientific Apparatus	217	121*
	640	NMS Minor Role in Plays	245	106*
	675	T-NOM Mechanical Arts	114	106*
	661	P-NOM Average One	192	104**
	676	T-NOM Dramatic Talent	358*	102*

Factor Variable	MFN	Criterion Measure	Factor Loading	Weight
V. Teacher-Evaluated Social Poise	692	T-NOM Tactful Social Skills	670**	245**
	688	T-NOM Social Poise	686**	194**
	700	T-NOM Resourceful Use of Objects	396**	186**
	686	T-NOM Power Behind the Scenes	481**	168*
	682	T-NOM High Perserverance	585**	150**
	691	T-NOM Self Insight	556**	144**
	684	T-NOM Assigned Tasks	555**	126**
	683	T-NOM Tangible Objects	317*	116*
	679	T-NOM College Success	524*	111**
	705	T-NOM Self-Disciplined	472**	101**
	652	P-NOM Unusual Ideas	-012	-113*
	655	P-NOM Foresees Consequences	092	-133**
VI. Musical Ability	673	T-NOM Musical Ability	779**	329**
	551	P-NOM Musical Ability	769**	329**
	637	NMS National Music Contest	654**	304**
	636	NMS State Music Contest	648**	268**
	523	P-NOM Potential Talents	351*	105*
VII. Striving Scientist	645	NMS Scientific Talent Award	596**	358**
	646	NMS Made Scientific Apparatus	506**	285**
	640	NMS Minor Role in Plays	301*	182**
	647	NMS Invented Patentable Device	262*	157**
	642	NMS Creative Writing	233	134*
	635	NMS Won Prize(s) in Art	244	132*
	668	T-NOM Math Ability	162	108*
	671	T-NOM Foreign Languages	-226	-104*
	518	P-NOM Brain ... Bookish	-174	-107*
	523	P-NOM Potential Talents	-198	-131*
	550	P-NOM Mechanical Ability	-132	-153*
	676	T-NOM Dramatic Talent	-236	-161*
	669	T-NOM Language Ability	-317*	-168*
	694	T-NOM Writes with Appeal	-325*	-191**
VIII. Artistic Ability	546	P-NOM Artistic Ability	764**	388**
	672	T-NOM Artistic Ability	607**	300**
	635	NMS Won Prize(s) in Art	574**	285**
	707	T-NOM Truly Creative	443**	195**
	643	NMS Published Cartoon	370**	174*
	523	P-NOM Potential Talents	285*	122*
	686	T-NOM Power Behind the Scenes	-135	-102*
IX. Potential Delinquent	660	P-NOM Wild One	693**	339**
	521	P-NOM Nonacademic Model	650**	326**
	545	P-NOM Daydreamer	566**	285**
	550	P-NOM Mechanical Ability	377*	185*

Factor Variable	MFN	Criterion Measure	Factor Loading	Weight
IX. Potential Delinquent (Continued)	702	T-NOM Victim of Circumstances	293*	145*
	674	T-NOM Interpretive Arts	270*	111*
	656	P-NOM Effective Leader	-105	-129*
X. Athletic Ability	677	T-NOM Athletic Talent	785**	433**
	547	P-NOM Athletic Ability	778**	433**
	523	P-NOM Potential Talents	214	139**
	550	P-NOM Mechanical Ability	178	111*
	641	NMS Lead in H.S. or Church Play	-202	-107*
	697	T-NOM Thinks Divergently	-152	-110**
	652	P-NOM Unusual Ideas	-131	-134**
	700	T-NOM Resourceful Use of Objects	-227	-140*
	640	NMS Minor Role in Plays	-230	-144*
XI. Reputed Brain	548	P-NOM Math Ability	840**	195**
	668	T-NOM Math Ability	811**	176**
	667	T-NOM Scientific Talent	701**	168**
	518	P-NOM Brain ... Bookish	752**	151**
	549	P-NOM Science Ability	780**	142**
	666	T-NOM Intellectual Ability	686**	119**
XII. Recognized Strainer	639	NMS Arranged Music for Public Performance	764**	512**
	638	NMS Composed and Performed Music	700**	459**
	643	NMS Published Cartoon	319*	190**
	647	NMS Invented Patentable Device	-135	-123*
	672	T-NOM Artistic Ability	-165	140*
	674	T-NOM Interpretive Arts	-193	[illegible]
XIII. Mechanical Aptitude	675	T-NOM Mechanical Arts	734**	512**
	683	T-NOM Tangible Objects	569**	379**
	550	P-NOM Mechanical Ability	407**	299**
	686	T-NOM Power Behind the Scenes	222	125*
	634	NMS Publication(s)	156	113*
	645	NMS Scientific Talent Award	-112	-138*
	669	T-NOM Language Ability	-238	-168**
XIV. Potential Politician	681	T-NOM Political Success	746**	211**
	676	T-NOM Dramatic Talent	674**	198**
	644	NMS Original Scientific Paper	605**	136*
	696	T-NOM Synthesizing Ability	677**	134**
	690	T-NOM Interpersonal Perception	560**	117*
	694	T-NOM Writes with Appeal	442*	101*

Factor Variable	MFN	Criterion Measure	Factor Loading	Weight
XV. Teacher-Evaluated Interpretive Sensitivity	674	T-NOM Interpretive Arts	358**	264**
	676	T-NOM Dramatic Talent	108	169*
	690	T-NOM Interpresonal Perception	142	162**
	685	T-NOM Empathic Sensitivity	167	156**
	551	P-NOM Musical Ability	165	127*
	692	T-NOM Tactful Social Skills	148	126*
	669	T-NOM Language Ability	-247*	-102*
	672	T-NOM Artistic Ability	-219	-112*
	682	T-NOM High Perseverance	-215	-129*
	637	NMS National Music Contest	-256*	-188*
	671	T-NOM Foreign Languages	-477**	-283**
	670	T-NOM Social Sciences	-505**	-334**
	702	T-NOM Victim of Circumstances	-433**	-339**

as having ability in mathematics. On the other hand, teachers seldom nominate them as a "power behind the scenes," or as being resourceful in the use of objects.

C-2 Creative Effectiveness. Frequently named by age-mates as an individual who is an effective leader, has a great many good ideas, exhibits a creative imagination, and comes up with some unusual ideas.

C-3 Academic Performance. Individuals who have relatively high scores on standard tests (STEP) of social studies, science, and mathematics, as well as on college entrance tests (SCAT, V+Q); and who are positively evaluated as scholars by their teachers (GPA).

C-4 Rhetorical Ability. Individuals who report one or more publications other than in a school paper, winning one or more speech contests, receiving prizes or awards for creative writing, taking the lead in high school or church plays, or playing minor roles elsewhere (National Merit Scholarship Criteria). These persons also are named by teachers as individuals who write with appeal, have dramatic talent, and excel in the interpretive as well as mechanical arts. Peers, however, may look upon them as "average kids."

C-5 Social Poise. In addition to being poised, teachers evaluate such individuals as having tactful social skills, being resourceful in the use of objects, possessing power behind the scenes, highly perseverent, showing self insight, and accomplishing assigned tasks. Their teachers also perceive them as self-disciplined persons who prefer to deal with tangible objects, and who are going to be successful in college. Their age-mates, who do not name them as poised, may believe they have unusual ideas and that they are able to foresee consequences of what they may do.

C-6 Musical Ability. Teacher nominations for musical ability as well as math ability are supplemented by peer nominations for both musical abilities and potential talents. These individuals report they have placed in national and state music contests (NMS criteria).

C-7 Striving Scientist. Individuals who report winning a scientific talent award, making scientific apparatus, and inventing a patentable device. They also indicate minor role(s) in plays, winning prize(s) in art, as well as creative writing. A number of teacher and peer nominations do not necessarily support this picture of a striving scientist.

C-8 Artistic Ability. Peer as well as teacher nominations for artistic ability together with reports on the NMS schedule of winning prize(s) in art and having a published cartoon. Age-mates perceive potential talents and teachers name them as truly creative but not as a "power behind the scenes."

C-9 Potential Delinquent. Age-mates tend to nominate such negatively-valued individuals as "wild ones," "daydreamers," and "persons not to work with on school problems" (nonacademic models). Teachers name such persons as "victims of circumstances." Peers seldom regard them as effective leaders. The tendency not to regard such persons as academically inclined may be epitomized in age-mate nominations for mechanical ability.

C-10 Athletic Ability. Nominations for athletic talent are received from both peers and teachers. Age-mates also may indicate that such individuals have "potential talents" as well as some mechanical ability. Contrary to the usual expectations, peers do not believe these individuals are effective leaders. An exhibitionist element in such persons may be the tendency of some to say they have had minor roles in plays.

C-11 Reputed Brain. Both teachers and age-mates tend to nominate the individual for ability in mathematics. In addition, teachers often appear to beleive they have scientific talent as well as intellectual ability. Age-mates usually recognize the ability in science and seem to regard such persons as "bookish" people placed in the age-mate category "brains."

C-12 Recognized Strainer. Although some individuals attest to their talents on the National Merit Scholarship form, teachers do not frequently nominate them for either artistic abiltiy or potential in the interpretive arts.

C-13 Mechanical Aptitude. Both teachers and age-mates agree in nominations for mechanical abilities. Teachers also tend to say such individuals prefer to deal with tangible objects and seldom name them for language ability. Very few report they have received an award for scientific talent (NMS).

C-14 Potential Politician. Teachers frequently forecast political success as well as recognize dramatic talent, synthesizing ability, and the capacity to write with appeal. Some individuals claim they have written an original scientific paper.

C-15 Interpretive Sensitivity. Teachers often nominate individuals for ability in interpretive arts, for dramatic talent, for interpersonal perception, as well as empathic sensitivity and tactful social skills.

Development of Ninth-Grade Predictor Variables

The next step, summarized in Table 2.02, involved the mapping of antecedent "factors in persons" which could have been used to predict the kinds of talented behavior which would appear to be culturally valued (or disvalued) during the year of graduation from high school. A factor analysis of the 39 predictor measures obtained in Grade IX yielded nine factor variables which have been assigned names in Table 2.02. The factor loadings are summarized in Table A.31 and the partial regression weights used to compute factor scores for each of the 1,464 ninth-grade HTRP subjects on the fifteen predictor "factors in persons" appear in Table A.32 of Appendix A. Table A.33 also appears as Table 2.02 in this chapter and Table A.34 indicates that the ninth-grade predictor variables are relatively independent of one another. The heading "MFN" refers to a "master file number" for each predictor measure employed with the boys and girls attending Grade IX in the four Texas communities. Again, regression weights have been obtained to select the predictor measures which make the maximum independent contributions to defining each of the nine "factors in persons."

As in the case of the criteria of talented behavior in the twelfth grade of the HTRP years, the antecedent ninth-grade predictor variables (derived from Tables A.31 and A.32 in Appendix A) can be described in terms of component measures. As indicated in a section to follow, there is enough correspondence between the nine factors derived from the 1959-60 measures and the fifteen "predictor" variables obtained two years earlier when the HTRP began (1957-58) to persuade one that the "factors in persons" have a construct validity. The later section on "stability of predictors," however, demonstrates the transformation in capabilities and attributes taking place between preadolescence (1957-58) and early adolescence (1959-60). Factor loadings and beta weights of each of meaningful predictor measures for the set of nine ninth-grade predictor factors are summarized in Table 2.02.

P-1 Convergent Thinking. Performances on tests which require the selection of appropriate responses in the perception of spacial relations, abstract thinking, the redefinition of concepts, and tasks set by tests of intelligence. The ability to pay attention to what is said, blocking impulsive action, also plays a part along with family background.

P-2 Peer-evaluated Brain. Age-mates tend to regard some individuals as "brains," who are conscientious and avoid failure as well as being able to cope with difficulties. They may be regarded as academic models--persons to work with on school problems.

TABLE 2.02

Factor Loadings and Regression Weights for Appropriate Predictor Measures Describing Nine Factors as Dimensions of Behavior among 1464 Students in the Ninth Grade at Four Texas Communities of The Human Talent Research Program (HTRP)
(N = 1464)

Factor Variable		MFN	Predictor Measure	Factor Loading	Weight
I.	Convergent Thinking	161	DAT Space Relations	736**	290**
		160	DAT Abstract Reasoning	734**	245**
		279	Gestalt Transformation	702**	239**
		212	CTMM Intelligence	724**	235**
		225	STEP Listening	733**	212**
		371	ISS Family Status	472**	147**
		284	GFT Unusual Uses	549**	122**
		280	KRT Mutilated Words	075	-127*
II.	Peer Evaluated Brain	357	P-NOM Avoids Failure	943**	285**
		364	P-NOM Brain	874**	269**
		363	P-NOM Copes with Difficulty	926**	269**
		356	P-NOM Academic Model	818**	200**
		179	P-NOM Conscientious	621**	115*
III.	Peer Evaluated Isolation	348	P-NOM Left-Out	891**	383**
		341	P-NOM Negative Behavior Model	864**	361**
		358	P-NOM Negative Academic Model	657**	254*
		346	P-NOM Quiet One	501**	237*
		344	P-NOM Imaginative	292*	101*
IV.	Neurotic Anxiety	257	CYS Social Inadequacy	797**	290**
		258	CYS Personal Maladjustment	766**	285**
		263	CMAS Anxiety	749**	260**
		260	NNA Achievement	646**	259**
		261	NNA Aggression	453*	133*
		270	JPQ-11 Surgency vs. Desurgency	264*	130*
		267	JPQ-1 Emotional Sensitivity	219	112*
		256	SSHA Scholastic Motivation	-504**	-141*
V.	Divergent Thinking	283	GFT Consequences	696**	316**
		280	KRT Mutilated Words	646**	292**
		281	KRT Short Words	630**	290**
		282	GFT Common Situations	660**	264**
		285	GFT Seeing Problems	648**	254**
		270	JPQ-11 Surgency vs. Desurgency	290*	126*
		161	DAT Space Relations	005	-150*
		179	P-NOM Conscientious	029	-107*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
VI. Competence Motivation	267	JPQ-1 Emotional Sensitivity	758**	509**
	256	SSHA Scholastic Motivation	410*	234**
	346	P-NOM Quiet One	335*	214*
	260	NNA Achievement	128	135*
	259	NNA Aggression Anxiety	158	103*
	279	Gestalt Transformation	-185	-118*
	344	P-NOM Imaginative	-121	-131*
	264	CYS Negative Social Orientation	-322*	-212*
	261	NNA Aggression	-602**	-364**
VII. Alienation Syndrome	266	CYS Criticism of Youth	747**	436**
	265	CYS Authoritarian	759**	436**
	259	NNA Aggression Anxiety	412**	258**
	264	CYS Negative Social Orientation	487**	232**
	270	JPQ-11 Surgency vs. Desurgency	-372**	-233**
VIII. Peer Visibility	178	P-NOM Conforming	763**	407**
	177	P-NOM Expedient	654**	306**
	340	P-NOM Behavior Model	610**	301**
	344	P-NOM Imaginative	449*	160*
	180	P-NOM Rational Altruistic	474*	157*
	270	JPQ-11 Surgency vs. Desurgency	291*	140*
	371	ISS Family Status	249	124*
	363	P-NOM Copes with Difficulty	121	-120*
	357	P-NOM Avoids Failure	062	-125*
	358	P-NOM Negative Academic Model	018	-128*
	283	GFT Consequences	044	-130*
	364	P-NOM Brain	083	-241*
IX. Peer Evaluated Impulsivity	176	P-NOM Amoral	677**	503**
	358	P-NOM Negative Academic Model	437*	307**
	259	NNA Aggression Anxiety		246*
	177	P-NOM Expedient	403*	233*
	179	P-NOM Conscientious	153	120**
	264	CYS Negative Social Orientation	-090	-109*
	280	KRT Mutilated Words	-067	-110*
	344	P-NOM Imaginative	-182	-198**
	340	P-NOM Behavior Model	125	-275*
	346	P-NOM Quiet One	-480*	-340**

P-3 Peer-evaluated Isolation. In Grade IX, age-mates indicate some individuals are left out of things, and are "queer ones," although they may be imaginative. These girls and boys often are named as Negative Behavior Models (persons not to copy in dress and behavior) and as Negative Academic Models (persons not to study with or work with on school problems).

P-4 Neurotic Anxiety. Self reports reflect symptoms of anxiety, which may stem from the need to achieve and underlying hostility, together with feelings of social inadequacy and indications of personal maladjustment. Such persons do not appear to be motivated scholastically in terms of their Grade IX responses.

P-5 Divergent Thinking. Ability to think in different, less goal-bound directions marked by ideational fluency (Common Situations); conceptual flexibility (Consequences); sensitivity to, or awareness that problems exist (Seeing Problems). Such attributes may be present in individuals who are active but not necessarily conscientious.

P-6 Competence Motivation. Individuals nominated by age-mates as "quiet ones" frequently represent themselves as persons who are motivated scholastically as well as being emotionally sensitive (rather than tough-minded). These persons are concerned about "being somebody" and anxious about hostile feelings and social attitudes which they tend to inhibit.

P-7 Alienation Syndrome. A mixture of anxiety, resentment, loneliness, and pessimism is reflected in responses to sets of items which reflect criticism of age-mates, anxiety about aggression, an authoritarian upbringing, and passivity together with negative attitudes toward the social milieu.

P-8 Peer Visibility. Active boys and girls from middle-class families frequently are nominated by age-mates as conforming persons, sometimes a bit expedient in achieving what they desire, persons to copy in dress and behavior, imaginative, and usually considerate of others. Such persons seldom are regarded as "brains," and do not necessarily face up to difficulties.

P-9 Peer-evaluated Impulsivity. Age-mate nominations for "do what they like, not caring about what others think" (amoral) are linked with others for "not ask to help on a school problem" (negative academic model) as well as being "strictly for themselves"(expedient). Their self reports indicate some anxiety about aggression together with negative attitudes toward society. Such individuals seldom are named as Behavior Models or Quiet Ones by their peers.

Analyses of Data

Independence of Factor Variables

Two intercorrelation matrices, Table 2.03 for twelfth-grade criterion factor variables and Table 2.04 for ninth-grade predictor factor variables, share a common characteristic. All correlations among the obtained "factors in persons" are low. Thus, for all intents and purposes, the obtained factors are orthogonal; that is, independent of one another. Where small correlations do appear, they are merely consequences of the method of obtaining factor scores and the populations employed. As indicated earlier, the regressions of each criterion factor upon all 87 criterion measures of Grade XII "talent," as well as those of each dimensional factor upon all 39 predictor measures of Grade IX behavior, were employed to compute factor scores for each person (Veldman, 1967, pp. 85-114). Such scores were obtained for the 15 criterion factors among 961 students in attendance during Grade IX. The tabled values indicating some insignificant degree of correlation appear to be a consequence of basing intercorrelation matrices upon the factor scores for the 629 boys and girls who completed test batteries in Grade VII, IX, and XII in each of the four communities studied.

Stability of Predictor Variables

Table 2.05 (which appears as Table A.35 in Appendix A) records correlations between fifteen seventh-grade factor variables (A.29) and the nine ninth-grade predictor variables (A.33) based upon factor scores for 629 HTRP subjects. The highest correlation, of course, is .70 for Convergent Thinking with DAT Space Relations, Gestalt Transformation, CTMM Intelligence, and STEP Listening having high loadings among the predictor components for both years. In Grade IX, DAT Abstract Reasoning becomes a substitute for DAT Mechanical Reasoning in Grade VII. Peer-evaluated Brain (IX-17) is linked with Age-Mate Acceptance (VII-1) and Peer Visibility (VII-10) two years earlier. Peer-evaluated Isolation (IX-18) also makes sense since the early adolescent factor correlates .38 with Peer-evaluated Impulsivity and .17 with Amoral Self-gratification in the preadolescent year. Both Neurotic Anxiety (.49) and Divergent Thinking (.50) clearly are related over the two-year period.

The remaining factor variables (IX-21 to IX-24) show the greatest instability during the years of transformation (preadolescent VII to early adolescent IX as studied in Chapter IV of McGuire & Associates, 1969a). The correlation for Competence Motivation (VII-5 and IX-21) is negative (-.45) but JPQ Emotional Sensitivity and SSHA Scholastic Motivation are components with substantial positive loadings in both years. Closer examination reveals a some-

TABLE 2.03

INTERCORRELATION OF TWELFTH GRADE CRITERION FACTOR VARIABLES

No.	Variable	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
25	Teacher Evaluated Productive Thinking (I)	1.0	09	-03	10	05	03	-10	02	10	-02	-15	02	-09	05	07
26	Peer Evaluated Creative Effectiveness (II)		1.0	01	-02	-01	02	07	00	01	02	10	02	00	11	00
27	Academic Performance (III)			1.0	-04	-01	04	-02	00	03	-01	01	-02	-02	-05	-04
28	Rhetorical Ability (IV)				1.0	02	02	04	15	01	-04	03	07	-03	-26	-09
29	Teacher Evaluated Social Poise (V)					1.0	00	00	-04	-01	02	03	-06	01	10	02
30	Musical Ability (VI)						1.0	01	-02	-03	-01	02	-02	00	06	-01
31	Striving Scientist (VII)							1.0	04	01	02	-11	01	-03	20	03
32	Artistic Ability (VIII)								1.0	-01	03	05	-15	00	-02	-08
33	Potential Delinquent (IX)									1.0	00	-02	05	03	-07	-04
34	Athletic Ability (X)										1.0	00	-06	02	-01	-02
35	Reputed Brain (XI)											1.0	00	03	-10	01
36	Recognized Strainer (XII)												1.0	04	-04	01
37	Mechanical Aptitude (XIII)													1.0	10	01
38	Potential Politician (XIV)														1.0	-10
39	Interpretive Sensitivity (XV)															1.0

TABLE 2.04

INTERCORRELATION OF NINTH GRADE PREDICTOR VARIABLES

No.	Variable	16	17	18	19	20	21	22	23	24
16	Convergent Thinking (I)	1.0	00	04	04	11	-04	-11	04	05
17	Peer-evaluated Brain (II)		1.0	-07	04	03	-00	03	04	03
18	Peer-evaluated Isolation (III)			1.0	08	02	04	-07	13	11
19	Neurotic Anxiety (IV)				1.0	-02	06	04	-06	-06
20	Divergent Thinking (V)					1.0	03	02	-05	-06
21	Competence Motivation (VI)						1.0	11	04	02
22	Alienation Syndrome (VII)							1.0	-01	-04
23	Peer Visibility (VIII)								1.0	-22
24	Peer-evaluated Impulsivity (IX)									1.0

TABLE 2.05

INTERCORRELATION OF SEVENTH GRADE AND NINTH GRADE PREDICTOR VARIABLES

		Variable - 9th Grade								
		Convergent Thinking	Peer-evaluated Brain	Peer-evaluated Isolation	Neurotic Anxiety	Divergent Thinking	Competence Motivation	Alienation Syndrome	Peer Visibility	Peer-evaluated Impulsivity
No.	Variable - 7th Grade	16	17	18	19	20	21	22	23	24
1	Age-Mate Acceptance	04	43	-11	-08	-00	-05	02	-19	01
2	Neurotic Anxiety	-01	08	07	49	-02	14	02	-01	-07
3	Convergent Thinking	71	13	04	-03	-03	-18	-04	17	-06
4	Peer-evaluated Impulsivity	-03	-10	38	01	01	-10	-01	-11	26
5	Competence Motivation	-07	-07	-10	29	14	-45	-01	-07	-09
6	Energetic Awareness	-10	-05	-07	10	-05	25	28	-17	01
7	Symbol Aptitude	-09	-07	07	-05	33	-01	13	10	01
8	Peer Stimulus Value	-05	20	07	02	05	06	04	-09	-06
9	Status Anxiety	04	05	-01	-03	09	-20	24	00	-13
10	Peer Visibility	03	45	-07	06	04	08	05	-69	42
11	Divergent Thinking	08	09	04	-02	50	03	04	-02	-11
12	Peer Isolation	06	21	04	19	16	33	09	29	-34
13	Amoral Self-gratification	-01	-05	17	-06	-00	-01	07	-14	39
14	Reactive Passivity	-01	04	-15	01	-05	12	00	-14	-10
15	Alienation Syndrome	00	-03	04	-03	03	02	34	04	-04

$r = .12$, ** $p < .01$; $r = .01$, * $p < .05$

57

what different set of criterion measures making up the Grade VII and IX components of the respective predictor variables. Moreover, the ninth-grade Competence Motivation factor has a link with the seventh-grade Peer Isolation variable (.33). Similarly, the Alienation Syndrome in Grade IX not only is related to the Grade VII factor of the same name (.34) but also to seventh-grade Status Anxiety (.24). The remaining ninth-grade factors on Table A.35 of Appendix A, Alienation Syndrome, Peer Visibility, and Peer-evaluated Impulsivity, all have some positive correlations with the seventh-grade predictors. Moreover, they reflect the preadolescent to early adolescent phenomena of transformation.

Results

The relations of predictor variables to criterion measures can be displayed in a number of ways. First, simple Pearson product-moment correlation coefficients serve to indicate which criteria have simple or more complex relationships to the antecedent ninth-grade predictor factors. This correlation approach suggests multiple regression studies of five criterion variables upon antecedent predictor factors. After a tentative interpretation, the basic and catalytic models presented in Chapter I are examined for their usefulness.

Relation of Predictor to Criterion Factor Variables

Table 2.06 (which also appears as Table A.37 in the analysis data of Appendix A to complete the working set there) sets forth the intercorrelations of Grade IX predictor factor variables and the Grade XII criterion factors for the 629 adolescents who were enrolled in the secondary schools of the four communities over the four-year period. Correlations of .12 are significant at the .01 level of confidence, and .09 at the .05 level, respectively.

Prior to reporting the applied multiple regression studies (which follow), a number of correlations appear to be worthy of some attention. Dimensional Factor I (Grade IX), Convergent Thinking (largely based upon tests which require appropriate cognitive responses) accounts for slightly more than 40 per cent of the variance (r = .64) in the Criterion Factor III, Academic Performance (Grade XII). Again, ninth-grade Dimensional Factor II, Peer Evaluated Brain, provides for more than 30 per cent of the variance (r = .56) in twelfth grade Criterion XI, Reputed Brain (based upon both student and teacher evaluations). The Potential Delinquent (Criterion IX, largely based upon teacher and age-mate nominations in the graduating year) seems to have some tendency to be isolated (r = .19), an anticonformist (r = .20) in the earlier ninth-grade year. Those regarded as being socially poised by teachers in Grade XII (Criterion V) tend to be nominated as "brains" by their

TABLE 2.06

INTERCORRELATION OF NINTH GRADE PREDICTOR AND TWELFTH GRADE CRITERION FACTOR VARIABLES

	Variable - 12th Grade														
	Teacher Evaluated Productive Thinking I	Peer Evaluated Creative Effectiveness II	Academic Performance III	Rhetorical Ability IV	Teacher Evaluated Social Poise V	Musical Ability VI	Striving Scientist VII	Artistic Ability VIII	Potential Delinquent IX	Athletic Ability X	Reputed Brain XI	Recognized Strainer XII	Mechanical Aptitude XIII	Potential Politician XIV	Interpretive Sensitivity XV
No. Variable - 9th Grade	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
16 Convergent Thinking (I)	01	03	64	-06	05	06	08	-07	03	-05	05	-00	02	10	-02
17 Peer-evaluated Brain (II)	01	47	14	11	27	16	-16	01	01	03	56	02	-00	-05	02
18 Peer-evaluated Isolation (III)	05	-08	-06	-04	-02	05	-00	-04	18	-08	-04	-10	01	03	-02
19 Neurotic Anxiety (IV)	-05	00	-14	-01	01	06	-00	08	-01	00	08	-03	-06	-02	-01
20 Divergent Thinking (V)	-11	-06	-15	-08	-04	-07	-08	-05	01	02	08	01	13	07	-02
21 Competence Motivation (VI)	-05	-13	-08	09	23	00	-18	08	-22	-17	04	01	-14	-17	09
22 Alienation Syndrome (VII)	-01	-01	02	03	09	-02	-14	-01	05	-06	-03	03	-07	-03	01
23 Peer Visibility (VIII)	-01	-24	05	01	-07	-02	-03	07	-22	-11	13	-08	-02	01	-02
24 Peer-evaluated Impulsivity (IX)	10	08	04	00	04	08	06	00	20	-02	-02	-01	02	03	02

r = .12, ** $p < .01$; r = .09, * $p < .05$

peers (r = .27) and to represent themselves as conformists (r = .23) in their ninth grade self-report instruments.

For the reader who is curious about the relation of seventh-grade predictor variables to twelfth-grade criterion factors, Table A.36 has been included in Appendix A. Academic Performance is a talent which has a substantial relation (r = .62) to Convergent Thinking back in Grade VII. Otherwise, there are no correlation coefficients exceeding .50 in the table. Apparently there is a considerable amount of transformation in the junior high school years as demonstrated in the earlier HTRP report (McGuire & Associates, 1967a).

Multiple Regression Analyses

Tables 2.07 and 2.08 have been constructed from regression of the criteria upon the ninth-grade predictors (Bottenberg & Ward, 1963) for two purposes. First, they show the most potent ninth-grade predictors for the twelfth-grade criterion factor variables. Second, they permit some comparison of the predictive efficiency of two approaches; namely, sets of factor-score predictor variables, and sets of raw score predictor measures. Only five of the 15 Grade XII Criterion Factor Variables have been selected for the pair of tables. They are the instances where Table 2.06 reveals some interesting relations to the ninth-grade predictors and where fairly substantial multiple correlations (R) between predictors and criteria have been obtained. In this brief report, the comparable entries for the other ten criterion factors seem to be only of limited theoretical interest.

Interpretation of Applied Multiple Regression Tables

The iterative sequence shown in parenthesis in each column of values for comulative multiple correlation squared (MC^2 or R^2) begins as (1) with the variable having the highest validity of the entire predictor system. For example, in Table 2.07, Peer-Evaluated Brain correlated highest of the nine predictor factors (r = .47 in Table 2.06) with Criterion Factor II, Creative Effectiveness, and is labeled by the MC^2 value, (1) .2252. With that selection fixed, Peer Visibility, labeled (2) .2933, was the factor variable which yielded the greatest increment in MC^2 for a two variable predictor set. The iteration sequence (in parentheses), each followed by MC^2 values, is shown for only the first five variables selected by the CDC computer as programmed. The MC^2 and R entries at the base of the table are the valued computed for regressions on all nine factor variables. In each instance of the regression sequences selected for Table 2.07, only a little more criterion variance is achieved by employing all nine predictor factors than by using sets of the first three or four factors.

TABLE 2.07

Multiple R^2 From Regressions of 5 Selected Criterion Twelfth Grade Factor Variables on 9 Ninth Grade Predictor Factor Variables.

(N = 629; decimals omitted)

Grade IX PREDICTOR FACTOR VARIABLES	GRADE XII CRITERIA				
	II Creative Effective	III Academic Performance	V Social Poise	IX Potential Delinquent	XI Reputed Brain
I. Convergent Thinking	*(5) 3177	(1) 4080	(4) 1373		
II. Peer Evaluated Brain	(1) 2252	(4) 5085	(1) 0741		(1) 3126
III. Peer Evaluated Isolation				(3) 1432	
IV. Neurotic Anxiety		(3) 4860-		(4) 3349	
V. Divergent Thinking	(4) 3156-	(2) 4587-	(5) 1416-		(3) 3296
VI. Competence Motivation	(3) 3086-		(2) 1255	(1) 0500-	
VII. Alienation Syndrome				(5) 1672	(5) 3376-
VIII. Peer Visibility	(2) 2933-		(3) 1334-	(2) 0942-	(2) 3244
IX. Peer Evaluated Impulsivity		(5) 5205-		(4) 1595	
All Variables:					
R^2	3185	5342	1462	1687	3409
R	564	731	382	411	584

* Number in parenthesis is iteration sequence rank order.

-A negative sign after any entry indicates the regression weight has a negative sign in the equation for all variables.

TABLE 2.08

Multiple R^2 Regression of 5 Selected Criterion Twelfth Grade Factor Variables on 25 Ninth Grade Predictor Variables.

(N = 555; decimals omitted)

	Grade IX Predictor VARIABLES	GRADE XII CRITERIA II Creative Effective	 III Academic Performance	 V Social Poise	 IX Potential Delinquent	 XI Reputed Brain
1.	Peer Nom: Amoral	*(3) 3291			(1) 0785	
2.	STEP Listening		(1) 4507			
3.	JPQ-11: Surgency vs. Desurgency		(7) 6238-			
4.	DAT: Space Rel.			(6) 1853		
5.	DAT: Abstract Reas.		(6) 6188			
6.	CTMM Mental Function		(2) 5221		(5) 1171	(6) 2303
7.	Common Situations			(8) 1911-	(7) 1286	
8.	Consequences					(5) 2255-
9.	Seeing Problems					
10.	Mutilated Words	(8) 3443			(6) 1210-	
11.	Short Words	(4) 3331	(8) 6297			
12.	JPQ-1: Sensitivity			(3) 1578		
13.	JPQ-8: Socialized Morale	(6) 3407		(5) 1805-	(2) 0960-	
14.	SSHA Scholastic Motivation					(8) 2364
15.	CMAS Anxiety			(4) 1706-		
16.	Social Inadequacy	(7) 4326				
17.	Pers. Maladjustment					(3) 2151
18.	Neg. Orientation to Society			(7) 1879-		
19.	Auth. Discipline					(7) 2349
20.	Criticism of Youth					
21.	Nom: Academic Model				(8) 1286	(4) 2204
22.	Nom: Copes	(1) 2869	(5) 6112-	(1) 0817		(1) 1789
23.	Nom: Party with	(2) 3243			(3) 1063	(2) 2050-
24.	Sex-role		(3) 5709-	(2) 1471		
25.	Grade IX GPA	(5) 3382-	(4) 6001		(4) 1114-	
All Variables	R^2	3550	6373	2035	1521	2532
	R	596	798	451	390	503

*Number in parenthesis is iteration sequence rank order.

-A negative sign after any entry indicates the regression weight has a negative sign in the equations for all variables.

A similar observation appears true for Table 2.08 devoted to single-variable raw-score predictor values. For example, Criterion III, Academic Performance in Grade XII, seems to be largely a function of what is measured by STEP Listening plus additional aptitudes measured by CTMM Mental Function together with sex-typed learning experiences and prior teacher-evaluated achievement in Grade IX. The value for MC^2, (4) .6001, only increases to $R^2 = .6373$, or $R = .793$, using all 25 predictor variables.

In addition, Tables 2.07 and 2.08 give an indication of the direction, or positive and negative influences, of the sequenced variables. Wherever a negative sign appears after a tabled entry, the associated variables has a negative standard regression weight for the final computations (Table A.39, Appendix A). Some variables facilitate (+) the talent being studied, whereas the others tend to block its subsequent appearance (-) at least to some degree. In the case of the Criterion Factor III, Academic Performance in Table 2.07, for example, the ninth-grade factors Convergent Thinking and Peer Evaluated Brain both contribute positively to prediction. On the other hand, ninth grade Neurotic Anxiety, Divergent Thinking, and Peer Evaluated Impulsivity represent negative influences. Certain entries for Table 2.08 compared with corresponding entries in Table 2.07 permit a comparison of factor variable prediction with raw score prediction in the five selected cases. For predicting the negatively valued Criterion Factor IX, Potential Delinquent, the first five factor variables selected into a predictor set (Table 2.07) account for 16.7 per cent of the criterion variances. On the other hand, the first five raw score predictors (Table 2.08) only account for 11.7 per cent of the criterion variance. Factor score predictors also are more strongly related to Criterion IX, Reputed Brain, than are the raw score predictors. The reverse is ture in the other three selected cases; raw score predictor sets appear more efficient in the instances of Creative Effectiveness, Academic Performance, and Social Poise (criterion variables II, III, and V, respectively).

Catalytic Effects Represented By Use of Moderator Variables

Table 2.09 has been constructed to summarize tests made to support the idea that some predictors usually employed in applied multiple regression studies (Basic Model) act *as if* they were catalysts either facilitating or hindering the effects of other predictor variables (Catalytic Model). The catalytic influence of one variable upon another is represented mathematically either by generating moderator variables (Saunders, 1956), which are the product of the two variables, or by computing and testing the changes made by introducing polynominal values of one or more variables in the original set.

TABLE 2.09

Comparative Regressions of Selected Twelfth Grade Criterion Factor Variables on Basic Theoretical Model and on Catalytic Models

(Entries are Multiple R's; decimals omitted)

SELECTED CRITERION FACTORS	Neurotic Anxiety		Divergent Thinking		Conformity Motivation		Alienation Syndrome	
	Basic Model	Catalytic Model	Basic Model	Catalytic Model	Basic Model	Catalytic Model	Basic Model	Catalytic Model
I. Productive Thinking	2027	2483	2012	2306	2024	2623*	1198	2191
II. Creative Effectiveness	5189	5245	5196	5239	5235	5243	5188	5196
III. Adacemic Performance	7005	7155**	6970	6972	6978	6980	7022	7027
V. Social Poise	4308	4490	4313	4419	4441	4693	4308	4354
IX. Potential Delinquent	2240	2240	2278	3114**	2643	3025	2760	3026
XI. Reputed Brain	4245	4434	4293	4456	4264	4583**	4179	[illegible]
XIV. Potential Politician	2567	2572	2590	2858	2766	4242**	2579	3249**

(Significant Increase in multiple R over Basic Model R; * $p < .05$; ** $p < .01$)

Only seven selected criterion factors have been regressed upon predictor measures in Table 2.09. They are the five criteria selected for Tables 2.07 and 2.08 with two others of theoretical interest to us; namely, C-1 Productive Thinking and C-14 Potential Politician.

Basic Model. For the basic model (McGuire, 1960, 1961), CTMM Mental Function (1) represented convergent thinking, Seeing Problems (2) was a measure of divergent thinking, and Mutilated Words (3) was the indicator of symbol aptitude. In addition to these potential abilities of each individual at some antecedent time, scores for CYS Personal Maladjustment (4), CMAS Anxiety (5), and CYS Negative Social Orientation (6) were employed to represent expectations and ability to cope with stress. Peer nominations as an Academic Model (7), or person to work with in school, indicated acceptance/avoidance by others such as age-mates.

To compute the multiple regression coefficients under the heading "basic model," each criterion factor was regressed upon the foregoing seven predictor variables (1 to 7) as well as four posuulated catalytic factor variables; namely, Neurotic Anxiety (8), Divergent Thinking (9), Conformity Motivation (10), and Alienation Syndrome (11). In addition, two dichotomous variables Sex Role (12) and Community (13, 14, 15, with "1" or "0" entries) were included. Methods are described in Appendix B, pp. B-1 to B-11.

Catalytic Model. To generate values for the catalytic model, moderator variables (Saunders, 1956) were computed by multiplying each of the original seven indicator variables (1 to 7) by each of the four catalytic factors (8 through 11). Consequently, for each of 555 subjects attending secondary schools from Grade IX to Grade XII we had a total of 58 variables; namely, 15 original predictor variable values, plus 15 criterion factor scores, and 28 generated moderator-variable scores. To compute the multiple R obtained under the heading "catalytic model" (see Chapter I and Appendix B), the CDC 1604 was programmed to regress each criterion-factor variable upon all 15 single-predictor values plus the 28 generated moderator values. This step was carried out to determine whether or not some catalytic effects probably were present. Further work is necessary to determine which of the generated moderator variables (multiplications of the values of two variables) theoretically are relevant and actually operate empirically to increase the multiple correlation coefficients significantly in terms of the appropriate F test (Appendix B, pp. B-11ff).

Catalytic Versus Basic Models

Multiple correlation coefficients have been computed for the basic and catalytic models to determine whether or not further studies of catalytic variables might be productive. Table 2.09

summarizes the results for seven factorially-defined categories of talented behavior and four theoretically-relevant "catalytic" factor variables. Among the 28 possibilities, at least six instances of significantly increased multiple R's at the .01 level of confidence are found.

In summary, each of the potential catalytic factor variables seems to be worthy of further exploration. Antecedent measures of neurotic anxiety, possibly the CMAS Anxiety Scale, apparently may be of some value in predicting subsequent academic performances. Similarly, signs of divergent thinking may be of value in generated moderator variables to forecast potential delinquency. Likewise, indicators of conformity motivation, such as SSHA Scholastic Motivation, may influence the subsequent utilization of abilities to explain the kind of cognitive style ("reputed brain") which emerges at some later time. Presence or absence of an alienation syndrome (anti-social attitudes, anxiety, pessimism, hostility) possibly may be important when employed in the catalytic sense in at least two instances.

Seventh-Grade Predictors and Twelfth-Grade Criteria

Factor scores for 1,570 seventh-grade HTRP subjects were computed, using Program ABSTRAC (Jennings & Veldman, 1963), and the Gestalten were depicted in Table 5.14 of The Years of Transformation (McGuire, Murphy, Jennings, Whiteside, & Foster, 1968). Appendix A has the output of that analysis in Tables A.27 to A.30, pp. A-112 to A-118. Transformations anticipated in the structure of the Gestalten from preadolescence to early adolescence have been confirmed by Table 2.05 and discussed on pages 2-13 to 2-17.

Four tables in Appendix A could be added to the ones presented in this chapter not only to support the theory of transformations associated with pubescence as an "inevitable human encounter" for both sex roles but also to urge that further attention be given to Sherif & Cantril's thesis that there is a significant "re-formation of the ego in adolescence" (1947, pp. 199-347). The Tables A.36 to A.39 show intercorrelations and regressions of twelfth-grade criterion factor scores upon the seventh-grade and ninth-grade Gestalten (pp. 1-11 to 1-19) respectively.

Discussion

We have approached the task of developing criteria of talented behavior by sorting nominations of teachers and age-mates, together with self representations on scales and National Merit Scholarship criteria into underlying "factors in persons." The resultant 15 criterion factor variables appear to have a considerable degree of psychological meaning and face validity. The means employed to develop these criteria and to compute appropriate factor scores for

66

each graduating senior operationally take account of a range of behaviors and attributes commonly valued and disvalued in a sample of secondary school settings.

The construct validity of the criterion factors seems evident from the applied multiple regression studies summarized in Tables 2.07 and 2.08. Sets of predictor factors (Table 2.07) yield multiple R values comparable to those computed from a number of predictor measures (Table 2.08). If an investigator were to carry on similar studies in other communities using somewhat different sets of criterion and predictor measures, however, we would expect other "factors in persons" to emerge. Frankly, we do not assert that our factor variables are going to be replicated at different locations, at other times, and when other sets of measures are employed. Nevertheless, in fresh situations, the comparable regression studies probably would indicate construct validity. This statement is supported by cross-validation studies recently completed by Whiteside (1964). Across-community cross-validations demonstrated the predictive efficiency of the applied multiple regression methods (Bottenberg and Ward, 1963; Jennings, 1964) employed in our longitudinal research. Comparisons of cross-validations with prevalidations in terms of coefficients of determination (RSQs) indicated that reductions in predictive efficiency were not excessive. Among 12 comparisons ($p < .05$), only 4 reductions could be regarded as significant with raw score data, 3 with factor scores and 2 with stanined scores. Prevalidations using teacher evaluations of academic achievement (GPA) as a single criterion ranged from RSQ = .6216 (R = .785) to RSQ = .8032 (R = .896). With factor variables as criteria, our values only approach this range in the case of C-3 Academic Performance.

Although single variable criteria may, upon further study, permit higher multiple correlations than factor variables, comparisons of Tables 2.07 and 2.08 do not necessarily indicate that single-predictor measures have an advantage over predictor factors. The latter have two real disadvantages. First, a great deal of time and expense is involved when scores for factors in persons are computed. Second, sets of factors vary according to the original sets of criterion or predictor measures employed, the population studied, and apparently from one year to another--particularly the years of transformation, the junior high school period. Nevertheless, we find that factor variables foster the idea that there are classes of variables. In addition to clarifying what a given instrument measures and indicating dimensions which may be measured by constructing new tests or scales, both factor analysis and regression studies as illustrated herein provide valuable information about the nature and relations among the attributes and characteristics of human beings.

The notion of a catalytic variable in the explanation and prediction of behavior or attributes from antecedent to subsequent times or situations appears to be worthy of further study. Table 2.09 illustrates at least one instance where adding an "interaction" term (generated by multilplying values for a predictor measure by those for a "moderator" or catalytic variable) has improved multiple correlation. The problem now is to establish theoretical and operational bases to guide such approaches to the improvement of prediction. That problem is attacked in Chapter III.

Conclusions

Apparently we have raised more questions in the process of attempting to find an answer to the twin problem of establishing the dimensions and criteria of talented behavior among young people in school settings across a number of communities.

For present-day middle-class Americans, competencies such as mechanical ability, athletic prowess, artistic ability, verbal fluency, leadership, dramatic ability, scientific curiosity and capability all are descriptive categories representing socially-valued forms of talented behavior. A number of these, but not all are included among the 25 criterion factors derived from 87 HTRP criterion measures. Would a different set be obtained in another sample of communities? Even with mark-sense cards, the process of obtaining nominations is expensive and time consuming. In what way are behavioral scientists ultimately going to solve the criterion problem in the dins of research such as we have reported herein? Throughout this paper, we have been highly aware of the problem of communication. Reporting work with factor variables instead of single measures seems to be highly confusing to many readers and listeners. Is the concept of factors in persons eventually going to lead some students of human behavior to develop sets of instruments, tests, and scales which validly and reliably represent theoretically and empirically relevant abilities, attributes, and other aspects of talented and/or intelligent behavior?

The application of factor analysis combined with multiple linear regression as a general approach to the formulation and analyses of research problems apparently began as a phenomenon of behavioral science research in the Southwest (Brown, Holtzman, & McGuire, 1955; McGuire, Hindsman, King, & Jennings, 1961; McGuire, 1961a; Fruchter & Jennings, 1962; Fruchter, 1966; Veldman, Peck, & McGuire, 1961; Jennings & Veldman, 1963). Moreover, the applications of multivariate methods illustrated in this report have found some degree of acceptance in research presented at AERA and APA annual meetings. Only now are we beginning to realize the power and applicability of multiple linear regression models (Ward, 1962; Bottenberg & Ward, 1963; Jennings, 1964; Veldman, 1967; Kelly, Biggs, & McNeil, 1969). Analyses of variance and covariance turn out to be special cases of treatment effects obtained in the presence of concomitant variables (Bottenberg & Ward, 1963). In terms of applied multiple regression, F-test comparisons are made between values obtained for "restricted" and "full," or unrestricted models. When interactions occur, they can be represented in prediction equations by incorporating "catalytic" or moderator variables. This is going to require work well beyond the point illustrated herein as well as more acceptable means of communication to readers not yet "at home" with the designs and statistics employed. The task is undertaken in the chapter which follows as an illustration of what has been and can be accomplished.

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CHAPTER III

TEACHER EVALUATION OF ACADEMIC ACHIEVEMENT[1]

Teacher evaluations, formerly reported as "marks" but now more frequently in terms of letter grades, represent "credit" in a legitimate and commerical sense. Transcripts showing academic credit permit a student to transfer from one school or college to another. An educational transcript records the bodies of content encountered by an individual in a school or college setting, the fixed time limits within which assimilation was expected to take place, and the extent to which individual accomodation to expectations has been achieved as represented by instructors' evaluations of their students. Piaget's concepts, "assimilation" and "accommodation" (1961), have been employed deliberately since they so aptly describe processes observable in the educational encounter, "a two-way affair in which both teacher and student risk themselves" (Moore, 1965).

Chapter III is concerned with an outcome of the educational encounter observed in the Human Talent Research Program (HTRP) over the three senior high school years; namely, academic achievement as a socially-defined talent. Such "talented behavior" can be explicated in the light of three questions:

(1) Does an operationally-defined measure representing each of the theoretical categories postulated to be basic dimensions of human behavior (McGuire, 1961; Chapter II in McGuire, Murphy, Jennings, Whiteside, & Foster, 1968) contribute independently to the prediction of grade point average (GPA) in the presence of measures representing every other theoretical category? (Test of basic and catalytic models set forth in Chapter I).

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[1] Based, in large part, upon the Ph.D. dissertation of Ray Whiteside, Dimensions of teacher evaluation of academic achievement. Ann Arbor, Michigan: University Microfilms, 1964. Dr. Whiteside (who is now Coordinator of Research Development at Abilene Christian College) designed and carried out his dissertation research while serving as a teaching assistant in the Department of Educational Psychology as well as a research associate and later as Executive Officer in the Laboratory of Human Behavior.

72

(2) Can a relatively small set of predictor variables (each representing an underlying dimension of antecedent behavior) be selected which would appear to be useful in forecasting academic achievement in the real-world situation of the public schools? (Explication by practical prediction)

(3) What evidence is there that a set of predictor variables obtained in accord with a dyadic theory of human development and behavior actually retains stability (usefulness) when regression information from one sample of subjects is applied to a new sample? (Cross validation among subpopulations in four HTRP communities)

A positive answer to each of the three questions should clarify some of the implicit assumptions and value premises which underlie the current heavy emphasis upon grades and standing in class (derived by ranking in terms of GPA or an equivalent) as indices of academic performance. Why has an average of the student's grades become the traditional criterion of performance not only in studies of academic achievement but also for admission to college? David E. Lavin has opened up this area of inquiry, particularly by including a brief section on "Value Judgments in the Choice of Performance Criteria" (pp. 14-17), in an introduction to his theoretical analysis and review of research for the Russell Sage Foundation upon The Prediction of Academic Performance (1965). In his closing chapter upon directions for future research, Lavin (pp.157-171) makes a strong case for what he terms "the social structure and personality approach" and charts the interactions between two personality variables and a role system (the student-to-student relationship) which he postulates have an influence upon levels of academic performance (p. 164) when the effects of "ability factors" have been partialled out. The personality variables are achievement motivation (n Ach) and need for acceptance among age-mates.

Theoretical Background

The segment of the HTRP represented in this chapter began with a pilot project undertaken by two staff members, Whiteside & Murphy (1963). Their Report Number 14 for the Laboratory of Human Behavior was essentially a feasibility study of whether or not "context theory" as depicted in Chapter I, particularly Figure 1.04 which is reproduced as Figure 3.01 herein, could be reconciled with the transformation of dyadic interaction theory into "basic" and "catalytic" models for the prediction of talent behavior as set forth in Chapter I.

73

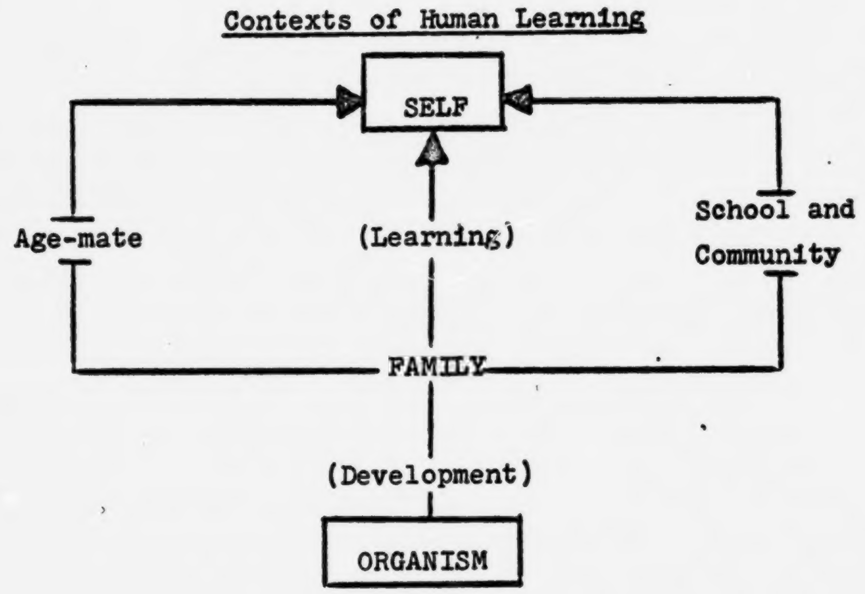
Contexts of Human Learning
SELF
Age-mate
(Learning)
School and Community
FAMILY
(Development)
ORGANISM

Figure 3.01. Contexts of development, social learning and self awareness.

Dyadic interaction theory essentially holds that the behavior of any person can be pictured, and to some extent, predicted in terms of three intertwined elements of a multiple regression equation which have their counterparts in three kinds of educational intervention designed to "upset the prediction." First, human potentialities such as different kinds of intellectual abilities and personality attributes tend to be stable unless someone intervenes. This may be done by posing questions such as "Who am I?", "What am I doing here?", and "Where am I going?" They elicit self-examination as well as the study of cognitive, attitudinal, and environmental-press variables which influence most kinds of learning. Second, expectancies or attitudes about one's self and others often show up as being passive-dependent, even anxious or alienated, rather than active and coping with persons and events as they are encountered. To intervene, the task of the instructor (backed up by a counselor, if necessary) is to "nudge" young people into thinking, feeling, valuing, and acting upon the basis of some attained balance between personal considerations and testing of reality. Third, subsequent evaluations of talented behavior are going to reflect antecedent attitudes of other persons or Betas (b) about any individual Alpha (a). Here, the most effective intervention often is to place the person (a) and the evaluator (b) into one-to-one settings where reciprocal stimulation can occur. Put in a metamathematical notation corresponding to Chapter I and to the model set forth in Figure 1 of an earlier HTRP report (McGuire, 1961, p. 66),[2] the prediction equation becomes

$$B_a = f(P_a, E_{a_1 b_1}, R_{b_1 a}), A_{a_1 b}, S_a, C_{ab} \qquad (1)$$

where

B_a = the (talented) behavior of a person (a) to be predicted, or explained, at some subsequent time.

P_a = the potential behavioral capabilities or value attached to the underlying dimensions of behavior in school settings (the gestalten of Chapters I and II) II) ascribed to the person (Alpha) in an antecedent set of evaluations.

$E_{a_1 b}$ = Expectations of Alpha (a) about one's own behavior and the probability of supportive or nonsupportive

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[2] Figure 3.02 is a photocopy of the page containing the referenced figure. The reproductions in both Figures 3.01 and 3.02 are for the convenience of the reader.

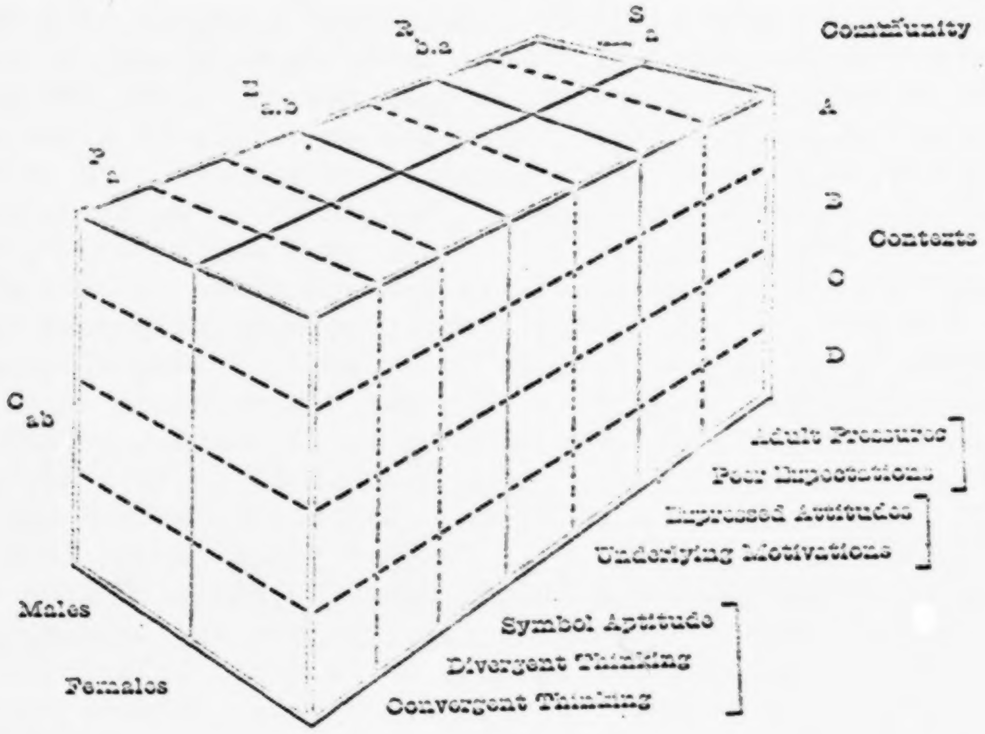
$R_{b.a}$
S_a
Community
$E_{a.b}$
A
P_a
B
Contexts
C
D
C_{ab}
Adult Pressures
Peer Expectations
Expressed Attitudes
Underlying Motivations
Males
Symbol Aptitude
Divergent Thinking
Females
Convergent Thinking

Fig. 1. Schematic diagram of a model for research in human talent.

$$B_a = f\,(P_a, E_{ab}, R_{b.a}), S_a, C_{ab}$$

B_a = behavior of the person (a) to be explained or predicted;

P_a = potential cognitive, perceptual, and other relevant abilities;

E_{ab} = elements of personality and motivation, especially expectations about one's own behavior and probable responses of other persons;

$R_{b.a}$ = responses of other persons (b) expressed in terms of their expectations and pressures they impose upon the given individual (a).

S_a = sex-role identification of the individual (a) and sex-typing of socialization pressures, both moderating preceding variables;

C_{ab} = context of behavior, such as a community or school setting which provides an institutional framework along with certain experiences and impersonal expectations; or, the setting in which a natural or a laboratory experiment takes place.

Figure 3.02. An antecedent schematic diagram and mathematical formulation of a model for research in talented behavior (McGuire, 1961).

responses of Betas (b) to it (that is, attitudes at some antecedent time.

$R_{b_1 a}$ = Responses of other persons (b), usually age-mate or teacher Betas, in terms of their expectations and pressures they impose upon the given individual or Alpha (a) at some antecedent time.

$A_{a_1 b_1}$ = Age-grade of the Alpha (a) being studied at an antecedent time with provisions for "generation gaps" between the person being studied and the Betas (b) subsequental evaluation of the behavior (B_a) being studied. (This moderator variable is not relevant since one age-grade was studied longitudinally in the HTRP)

S_a = Sex-role identification of the individual (a) and sex-typing of socialization pressures, both moderating preceding variables (Saunders, 1956).

$C_{a_1 b_1}$ = Context of dyadic ($a \rightleftharpoons b$) behavior, such as a community or school setting which provides an institutional framework along with certain probably experiences and impersonal expectations which may vary from one context to another for both Alphas (a) and Betas (b); or, the setting in which a natural or a laboratory experiment takes place. (Contexts, of course, are moderator variables.)

With this theoretical statement as the background, subsequent sections describe the methods and data used for testing the theory, the results of practical prediction, and the cross-validation studies which proved strong support for the method of selecting certain variables to represent the "factors in persons," gestalten, or antecedent underlying dimensions of behavior in a school setting proposed in Chapter I and studied as factor variables in Chapter II. The magnitude of the coefficients of determination (squared multiple correlation coefficients or RSQ) indicate substantial R's when regression weights obtained from one community (C_{ab}) are employed for prediction purposes in another.

Test of Theory

The basic data pool that was used for testing the adequacy of the theory was represented by two or three variables presumed to measure each of the "factors in persons" hypothesided as conceptually and influentially independent theoretical dimensions.

Using multiple linear regression techniques in a data reduction process, the most useful predictor per theoretical category was selected:

Theoretical Category	Postulated Measure
Catalyst	STEP Listening
Convergent Thinking	CTMM Mental Function
Divergent Thinking	Seeing Problems
Symbol Aptitude	Mutilated Words
Conformity Motivation	SSHA Scholastic Motivation
Neurotic Anxiety	CYS Personal Maladjustment
Authoritarian Socialization	CYS Negative Social Orientation
Peer Acceptance	Nomination: Academic Model
Sex-role	Binary variable (1 = female; 0 = male)

Tests summarized in Tables 3.01 and 3.02 led to decisions re those to be selected as a separate variable. The use of STEP Listening as both moderator and separate variables increased the Multiple RSQ the greatest amount (RSQ = .6182 as compared with RSE = .5568 without STEP Listening; $F = 71.14$, $p < .001$).

To test for significance of interaction, all catalytic multiplications (with CTMM Seeing Problems, and Mutilated Words) were deleted from the full model, the hypothesis in this case being that such multiplicative (moderator) variables had nonzero weights. The decrease in RSQ was significant at p 01. This result indicated interaction occurring in at least one of the three possible moderator variables. Therefore, each of the three ability measures times STEP Listening was tested one at a time for the significance of interactions. Only the STEP Listening by CTMM interaction was significant.

The variable selection process was completed. Mathematically, a linear regression full model representing the theory under study had been constructed as follows:

$$Y = a_0U_0 + a_1X_1 + a_2X_2 + a_3X_3 + \dots a_{14}X_{14} \qquad (2)$$

where, Y = the criterion, high school GPA in standard score form,

$a_0, a_1, a_2, \dots, a$ = regression weights (constants)

U = the unit vector (a 1 for each subject)
X_1 = STEP Listening
X_2 = CTMM Mental Function
X_3 = $(\text{CTMM})^2$
X_4 = (STEP Listening) X (CTMM)

X_5 = (STEP Listening) X $(\text{CTMM})^2$
X_6 = Seeing Problems
X_7 = $(\text{Seeing Problems})^2$
X_8 = Mutilated Words
X_9 = Scholastic Motivation
X_{10} = CYS Personal Maladjustment
X_{11} = CYS Negative Social Orientation
X_{12} = Nomination: Academic Model
X_{13} = Nomination: $(\text{Academic Model})^2$
X_{14} = 1 is subject where female; zero otherwise

Each of the measures in the full regression model was deleted at a time in order to compute a series of restricted regression equations. Every variable except CYS Negative Social Orientation contributed significantly to the prediction of high school GPA in the presence of the other variables ($p < .01$, see Table 3.01).

The selection of the measure to represent the catalyst was treated as a separate problem. Briefly, the factor of impulse control was hypothesized to operate in conjunction with mental ability in such a way that given any two different impulse-control scores and any two levels of mental ability, the criterion difference from one mental level to the other is not the same at the different points on the impulse control scale. In the terminology of Bottenberg & Ward (1963), the two independent variables were postulated to interact. Saunders (1956) refers to the same concept as moderator variables. If mental ability and the catalyst did in reality interact, this knowledge could be used to increase predictive efficiency by including a multiplicative variable in the predictor set.

Three instruments were selected as possible measures of impulse control: Peer Nomination for Amoral; JPQ-11, "Surgency vs. Desurgency;" and STEP Listening. The Peer Nomination for Amoral item, "... persons who do whatever they feel like doing a lot of the time. They don't seem to care what they do to other people, or what other people think," was somewhat descriptive of impulsive action. The possibility was considered that peer perception of this attribute in people and subsequent naming of persons to that category might be an effective measure of impulsivity.

Because JPQ-11 purports to measure the personality quality of excitability as opposed to serious quietness, Surgency vs. Desurgency was also chosen as a possible measure of impulsivity and/or impulse control.

The possibility that STEP Listening could be a measure of impulse control may be inferred from previous HTRP studies show-

Table 3.01 F-tests for the Significance of the Contribution of the Categorical Variables in the Presence of the Remaining Variables when Predicting High School GPA[1]

(N = 580)

MODEL DESIGNATION	RSQ	F
1. Full Model	.6120	
2. Drop STEP Listening	.5568	26.85**
3. Drop CTMM Mental Function	.5675	16.23**
4. Drop Seeing Problems	.6077	3.14*
5. Drop Mutilated Words	.6058	9.09**
6. Drop CYS Personal Maladjustment	.5989	19.16**
7. Drop CMAS Anxiety	.6057	9.29**
8. Drop CYS Neg. Soc. Orientation	.6120	.00
9. Drop Nom: Academic Model	.5602	37.85**
10. Drop Sex-role	.6006	16.63**

* $p < .05$

** $p < .01$

[1] It should be noted that "dropping" a variable from the full-model equation is equivalent to imposing the restriction that the coefficient associated with that variable in the full-model is zero.

ing the test to be significantly related to juvenile delinquency (Kelly, 1963) and highly related to academic achievement (Whiteside & Murphy, 1963). There are some requirements involved in responding to this instrument that suggest that STEP Listening may measure "control" of some sort to an important extent. A person responds to this instrument first by listening to the reading of a descriptive paragraph and, second, by listening to oral questions and then marking one of a series of written responses as the correct answer. To be relatively successful in making correct responses, one must be able to "attend to" what the reader is saying and to ignore irrelevant environmental attractions and internal impulses to do something else. Kelly (1963) refers to this quality as the ability to maintain a convergent set. Not only is the high scorer on STEP Listening required to know something, he needs to be able to pay close attention and keep himself oriented to the task at hand. Thus, the ability to control oneself seems quite relevant to the task of responding to this instrument of presumed listening ability. A high score on the test was assumed to indicate high impulse control.

The variable to represent the catalyst was selected in the same way as each of the other variables in the theoretical model. Each of the three purported measures of impulse control was added to the previously accumulated model with the mental ability score multiplied by the catalyst score for each individual subject as well as the catalyst.

Results of Practical Prediction

From the measures utilized in the full model selected in the "Test of Theory" section, a subset of variables was selected to form a combination that maximized predictive efficiency and more or less minimized the number of predictor measures involved.

The literature frequently indicates that the one variable that consistently yields more efficient GPA prediction than any other single variable is a previous measure of GPA (Bloom & Heyns, 1956, p. 76). Consequently, since ninth grade GPA's were available for the subjects, it was arbitrarily decided to place this potent indicator into the system of predictors. A test of curvilinearity of the ninth grade GPA against the criterion was significant at $p<.01$ ($F = 75.33$). Therefore, a new variable of the squared ninth grade GPA's was generated and added to the system. In addition, all the variables accepted in the full theoretical model named above were made a part of the predictor pool. Decisions were based upon tests shown in Table 3.02.

Table 3.02

F-tests for the Significance of Cumulative Variable Contribution to the Subset of Predictors

VARIABLE NAME	R S Q	F
1. Squared Ninth GPA	.5980	
2. (STEP Listening X CTMM)/1000[2]	.6766	140.44**
3. Mutilated Words	.6868	18.79**
4. Peer Nom: Academic Model	.6937	12.98**
5. Female	.6970	7.21**
6. Ninth GPA	.6978	3.97*
7. Scholastic Motivation	.6985	1.20

* = $p < .05$

** = $p < .01$

[2] Because the multiplication of STEP Listening score by CTMM score runs into four digit figures, these values were divided by 1000 in order to retain the significant digits in a six-digit computer print-out of regression weights for later computation of predicted GPA's.

Results of Cross Validations

In order to test the stability of the prediction information gained from the "Results of Practical Prediction," cross validations were performed. The regression weights obtained by analyzing predictive data from each community involved in the program were applied to the data of each of the other three communities. Cross validations were computed using (1) raw scores only, (2) factor scores plus ninth grade GPA squared, and (3) stanined scores, using a catalytic variable in each equation.

The raw score and stanined predictor variables used were the first five appearing in Table 3.02. The factor score variables were obtained by a principal-axis factor analysis with varimax rotation on thirty-nine measures in grade nine. Nine factors were extracted with eigen values greater than 1.0:

I. Convergent Thinking
II. Peer-evaluated Brain
III. Peer-evaluated Isolation
IV. Neurotic Anxiety
V. Divergent Thinking
VI. Conformity Motivation
VII. Authoritarian Socialization
VIII. Peer Visibility
IX. Peer-evaluated Impulsivity

Note: The nine factor variables reported in Table 2.02 have been described on pp. 2-9 to 2-14 and are shown to be reasonably independent of one another in Table 2.04 on p. 2-15.

Of the nine factors, those that were considered to be most equivalent to the raw score predictor variables previously selected were utilized in the cross validation problems.

Table 3.03 shows the results obtained when predictive information in raw score form was applied from each of the four communities to every one of the others, a total of twelve cross validations. The prevalidation RSQ for each community is listed in the diagonal in parentheses. Reading the columns one can see how much the predictive efficiency dropped when weights from other communities were applied to the prevalidation sample. The values are the same that one would obtain by actually computing predicted scores and correlating them with observed scores (Jennings, 1963).

Table 3.04 indicates a similar pattern of results except that all RSQ's are lower than in Table 3.03 and statistical decreases occur only in Community B. Factor scores were used in the calculations for this table, except for ninth grade GPA, which was used in raw score form as there was no achievement factor available. The catalytic vector was constructed by adjusting values for "Convergent Thinking" multiplied by "Peer-evaluated Impulsivity."

Table 3.03 Coefficients of Determination (RSQ)
on Cross Validation: Raw Score Predictors

Weights from \ Data from N =	COMMUNITY B 130 (Bandana)	COMMUNITY D 106 (Duneside)	COMMUNITY A 176 (Ashton)	COMMUNITY C 246 (Centerville)
COMMUNITY B	(.7815)	.6861	.7895	.6629
COMMUNITY D	.7585	(.7124)	.7967	.6865
COMMUNITY A	.7669	.7079	(.8032)	.6843
COMMUNITY C	.7282	.7065	.7853	(.6911)

F-ratios for Significance
of decrease in cross-validated RSQ

COMMUNITY B	-	1.524	1.988	3.652**
COMMUNITY D	2.175*	-	.936	.595
COMMUNITY A	1.399	.261	-	.880
COMMUNITY C	5.041**	.342	2.578*	-

* = p < .05
** = p < .01

Table 3.04 Coefficients of Determination (RSQ)
on Cross Validation: Factor Scores plus Raw Score Grade GPA

Weights from \ Data from N =	COMMUNITY B 130 (Bandana)	COMMUNITY D 106 (Duneside)	COMMUNITY A 176 (Ashton)	COMMUNITY C 246 (Centerville)
COMMUNITY B	(.7096)	.6171	.7251	.6019
COMMUNITY D	.6541	(.6578)	.7369	.6167
COMMUNITY A	.6786	.6484	(.7440)	.6098
COMMUNITY C	.6709	.6513	.7313	(.6216)

F-ratios for Significances
of Decreases in Cross-Validated RSQ

COMMUNITY B	-	1.982	2.093	2.083
COMMUNITY D	3.951**	-	.786	.518
COMMUNITY A	2.207*	.458	-	1.247
COMMUNITY C	2.755*	.316	1.406	-

* = $p < .05$
** = $p < .01$

Raw score regressions were obtained by employing squared ninth-grade GPA, STEP Listening to moderate CTMM as the catalytic variable, Mutilated Words to represent symbol aptitude, peer nominations for Academic Model, and being a female as a dichotomous variable to reflect sex-typed expectancies. They formed a set of five predictor variables derived from theory and confirmed in Table 3.02 as being most relevant to senior high school GPA as criterion of academic talent. Together with ninth-grade squared GPA values, Convergent Thinking moderated by a reversed scale for Peer-evaluated Impulsivity to form catalytic vector, Divergent Thinking, and Peer-evaluated Brain were used for the factor score equivalents on cross validation with female sex-role expectations also taken into account. (Divergent Thinking, though conceptually different from Symbol Aptitude as a factor in persons, was employed as the factor equivalent to Mutilated Words because the Symbol Aptitude instruments weighted highly on that factor).

Generally, the shrinkage in RSQ (three statistically significant decreases when Bandana regression weights were applied to the other three locations) was not as great for factor score variables as shrinkage using raw score variables. At the same time, the overall decrease in predictive efficiency seems to contra-indicate the use of factor scores for this purpose. In fact, inclusion of the raw score variable, ninth-grade GPA squared, in the predictor system is the primary reason that the coefficients of determination in Table 3.03 are as high as they are. For confirmation, see Table 9 in Whiteside's 1964 dissertation.

When the raw-score predictor variables were stanined, the results obtained appear in Table 3.05. The RSQ values for regression of GPA standard scores on predictor stanines are very similar to those obtained with raw score data, especially for the two northern communities, A and B, where no statistically significant shrinkage occurs when regression weights from one community are applied to the other weights from Bandana applied to Centerville, and vice versa, the shrinkage observed for the raw data RSQ's. There were only two statistically significant decreases in RSQ for the twelve stanined variable cross validations.

Although there always was a reduction in predictive efficiency in the three approaches when cross validations were compared with prevalidations by a coefficient of determination, the reductions were not excessive. Two shrinkages were significant at $p < .05$ and tow at $p < .01$ with the raw score data. Three cases utilizing factor scores and two instances involving stanined scores resulted in significant RSQ reductions.

Discussion

Before launching into the discussion, an explanation is due the reader. Whiteside completed his dissertation in the spring of 1964

Table 3.05 Coefficients of Determination (RSQ)
on Cross Validation: Stanined Predictors

Weights from \ Data from N =	COMMUNITY B 130 (Bandana)	COMMUNITY D 106 (Duneside)	COMMUNITY A 176 (Ashton)	COMMUNITY C 246 (Centerville)
COMMUNITY B	(.7725)	.6460	.7890	.6204
COMMUNITY D	.7540	(.6778)	.7956	.6447
COMMUNITY A	.7559	.6719	(.8011)	.6426
COMMUNITY C	.7408	.6668	.7870	(.6539)

F-ratios for Significance
of decrease in Cross-validated RSQ

COMMUNITY B	-	1.645	1.723	3.872**
COMMUNITY D	1.681	-	.783	1.063
COMMUNITY A	1.508	.305	-	1.306
COMMUNITY C	2.881*	.569	2.009	-

* = p <.05
** = p <.01

when his supervising professor (CMcG) still was recovering from and working toward rehabilitation after a massive CVA. Quite reasonably, Whiteside had identified the four HTRP communities as A, B, C, D in accord with the alphabetical order of the real names for each location. He had overlooked the fact that, in the original HTRP report (McGuire & Associates, 1960) written before he became a member of the research team, the designations A and B had been given to the two northern communities in the state whereas C and D had been reserved for the two locations toward the south on or near to the Gulfcoast of Texas. The error was discovered after completion of the initial draft of Chapter III in July of 1968. Pressures "to get the final report into Washington" forced us to decide to "correct" the row and column headings without altering the arrangement of the RSQ values and F-ratios for test of significance. The re-assessment also leads us to believe that three additional tables, 7, 9, and 11, in Whiteside's 1964 dissertation should have been revised for presentation in this chapter. For each of the four communities, they supply the prevalidation beta weights for regression of high-school GPA upon each of the five variables designated for the raw-score (Table 3.03), factor variables (Table 3.04), and stanine-value (Table 3.05) cross validations reported to this point. A reader who obtains the original dissertation from University Abstracts (No. 65-4357) at Ann Arbor should translate the Whiteside headings in terms of HTRP designations; namely, A (Bandana), B (Duneside), C (Ashton), D (Centerville). The pseudonyms for each location were chosen so that A, B, C, D could be employed as a code to "place" locations A and B, C and D in the different regions of the state and the first letter of the name would be a code for the location under study.

Coefficients of determination (RSQ values).- The coefficients employed in Tables 3.01 to 3.05 inclusive actually are multiple correlation coefficients squared. Retention of RSQ values not only facilitate use of the formula for computing F shown on p. B-16 of Appendix B on "Methodology." Every RSQ entry in the five tables exceeds a value of .4900 and many exceed .6400 in magnitude. Thus the multiple correlation coefficients (R) usually are within the range .70 to .80 and the proportion of the variance in the criterion variable, GPA as a measure of academic talent demonstrated over the senior high-school years, not "explained" by each of the three sets of five predictors (R^2-1) ranges from 50 to 36 per cent (Veldman, 1967, pp. 281-297). Indeed, RSQs for the prevalidation weights derived in Ashton (C) from raw and stanined data exceed .8000, a value which represents an R nearing .90, a magnitude seldom encountered by early students of regression upon two or more variates (Mather, 1947, pp. 146-152, 167-168). The multiple correlation, R, differs from the correlation with a single independent variate (r) in that its value always is positive. The random sampling distribution of multiple R depends upon the number of independent variates employed and the number of observations of the criterion variable regressing upon the, n-1, to determine degrees of freedom (See Table 13.6 in Snedecor, 1946, pp. 346-354). Parenthetically, all entries in Table 3.01 to 3.05 inclusive are statistically significant when the R is evaluated.

This part of the discussion is concluded with some observations prepared by Earl Jennings who was the first person to employ HTRP data in a theory-building dissertation entitled, "An Investigation of Cross-validation in Multivariate Prediction" (1963). One of the expressions frequently used to describe the meaning of the squared multiple correlation coefficient (RSQ), is "R^2 tells us what proportion of the criterion variance is accounted for by the predictors." Operationally, all this means is that an alternate formula for computing R^2 is a ratio where the variance of the predicted criterion value is divided by the variance of the actual criterion values. This ratio has a great deal of appeal because one of the primary attributes that a criterion variable exhibits is its variability. Variables exhibiting little variability (for example, the number of fingers on a human left hand) seldom are of research interest precisely because of the lack of variability.

Generally speaking, any systematic procedures for generating predicted criterion values yields values over a sample of persons which have less variability than the observed criterion values on those same persons, and the ratio will be less than unity. One way of increasing the magnitude of this ratio is to increase the number of predictors. If the number of predictors added to a multiple regression is sufficiently large, however, the R^2 eventually will achieve unity. Because of this mathematical fact, the magnitude of an R^2 is of little interest in the absence of information about the sample size and the number of predictors. Moreover, the crucial question generally is whether or not the equation will "work" for sets of data other than those in the original sample.

When the weights derived from one sample are applied to the predictors in a second sample, the predicted criterion values do not in any way depend on the actual criterion values. In this event the magnitude of the ratios of the two variances becomes an interesting value. As shown in Tables 3.03, 3.04, and 3.05 the non-parenthetical values, that is, the ones in the triangles set apart by the diagonal values, are proportions of the observed variance in GPA accounted for by the predictors on cross validation. Generally speaking, the values are satisfactorily high and sufficiently resistant to "shrinkage." The results rather clearly demonstrate the explanatory power of sets of "predictor" variables selected in accord with metamathematical formulations of a "Basic Model" (pp. 1-26 to 1-30) and a "Catalytic Model" (pp. 1-30 to 1-33) which were derived from a dyadic interaction theory and its representation in a pattern model (pp. 1-19 to 1-26) developed in Chapter I.

Cross validation.- Paul Horst (in Cattell, 1966, pp. 139-140) expresses some reservations about the evaluation of significance in multivariate analysis, particularly in cross validation where the results (computed regression weights for the variates) obtained from one experiment (naturalistic observations at one location) are

89

applied in another as in Tables 3.03, 3.04, and 3.05. The cross validation populations and RSQ values obtained in this chapter, however, would seem to contra-indicate his major reservation; namely, "But for the multivariate analysis designs, we never have enough cases" (p. 140). Moreover, Horst's objection that cross validation is "a purely empirical approach" (p. 139) has also been contradicted by the "test of theory" built into this cross-community inquiry into teacher evaluations of academic achievement. To review briefly, the initial prediction equation (1) on p. 3-4 was derived from a theory first represented as a dyadic interaction pattern model (Kaplan, 1964, pp. 325-326, 332-336) after the introduction of theory in Chapter I (Figure 1.03 on p. 1-20) followed by translation into metamathematical and multiple-regression statements of propositions logically consistent with the theoretical model as well as a concise review to begin this chapter (pp. 3-2 to 3-6). The basic (pp. 1-26 to 1-30) and catalytic (pp. 1-31 to 1-33) variants then were expressed mathematically as a "full model" multiple linear regression equation (2), pp. 3-7 to 3-8, with provisions for identifying the presence of any curvilinear form (X_3) and interaction vectors (X_4, X_5) by tests carried out in Tables 3.01 and 3.02 to complete a test of theory and begin cross-validation studies.

Interaction vectors, where the relationship of one predictor (e.g., mental function tested by CTMM) to the criterion is believed to vary according to the level of a second predictor (e.g., impulse control in so far as it is reflected in STEP Listening scores), were considered in studies of the catalytic and basic models reported in Chapter II. Bottenberg & Ward (1963, pp. 61-71) not only depict the linear (X) and "curvilinear" (X^2) forms of polynomials (Figures 1 and 2, pp. 63-64) but also demonstrate the use of polynomial and interaction forms to express and test hypotheses. Instead of being "a purely empirical approach," then, the tests and validations in Tables 3.01 to 3.05 represent the operations of an approach marked by "dynamic openness," a highly desirable characteristic of inquiry in a behavioral science (Kaplan, 1964, pp. 68-70).

GPA and the self-fulfilling prophecy.- In his theoretical analysis and review of research upon the Prediction of Academic Performance for the Russell Sage Foundation, Lavin (1965) asserts, "A third index of ability involves measures of prior scholastic performance as predictors of future performance" (p. 51). Then he adds, "While it has been conventional to use high school grade as an ability measure for predicting college performance, it should be noted that ability is not the only factor determining the high school record. Numerous personality and social factors are involved" (pp. 51-52). Lavin's point of view is strongly supported by the curvilinear relation of ninth-grade GPA's to the criterion, overall senior-high school GPA's. Table 3.02 demonstrates that squared ninth-grade GPA, with RSQ = .5980 on p. 3-11, leaves only about 40 per cent of the variance in the criterion GPA at high-school graduation unexplained. Instead of being linear, as one would infer from the literature, the relationship is curvilinear (a characteristic of some of the transformations in attributes studied in Chapter IV of an earlier report by McGuire, Murphy, Jennings, Whiteside & Foster, 1968). Teacher expectations (rs) about pupils formed in the ninth-grade year apparently placed the boys and girls in positive and negative positions on a curve, or form with one change in direction of the function, and at some adaptation level of achievement relative to one another. Subsequent assessments, in terms of inferences from Tables 3.03 to 3.05, modified by additions to and subtractions from the antecedent evaluation(s) in terms of variates introduced to test a theory and derived models kept open so the pattern could be filled in by demonstrating probable relations and testing any reasonably extensions suggested by new knowledge, including possible interactions among variates.

Reference to teacher expectations (teacher as Beta with central processes evaluating pupil(s) as Alpha(s) in the context of the educational encounter over the senior high-school years, grade nine to high-school graduation in terms of Figure 1.03, p. 1-20) brings to mind a significant new book, Pygmalion in the Classroom, by Rosenthal & Jacobson (1968) wherein they focus upon teacher expectations and variations in pupils' intellectual development. The theme of the book is that one person's expectation for another's behavior may come to serve as a "self-fulfilling Prophecy," the title of a fascinating article reviewing all the supporting work to date in the September issue of Psychology Today (1968) by Robert Rosenthal. The author concludes, "So not only does the experimenter influence his subjects to respond in the expected manner, but the subjects may well influence the experimenter to behave in a way that leads to fulfillment of his prophecies" (p. 51), an illustration of the central nature of reciprocal stimulation in the dyadic interaction formulation for understanding observed human behavior, including the development of intelligent, talented, and creative forms of creative behavior, the recurring theme of this report. In fact, the data being discussed not only support the tenability of the "self-fulfilling prophecy" but also demonstrate the manner in which it operates. Parenthetically, we should report that, in the analysis of prevalidation beta weights for Bandana (Table 9 in Whiteside, 1964), the RSQ for ninth-grade GPA squared was .8214 and the inclusion of a catalytic vector wherein peer-evaluated impulsivity moderated Convergent Thinking factor scores together with the other factor variables and expectations associated with the female sex role reduced the RSQ transferred to Table 3.04 to (.7096) placed in the diagonal. For the other three communities, the values in the diagonal reflect increases in RSQ upon modification of the contribution of ninth-grade GPA squared.

The catalytic effect.- Table 3.02 on p. 3-11 demonstrates that, for the total HTRP population studied (N = 658), the postulated (STEP Listening x CTMM Mental Function) interaction was highly significant in terms of its contribution to the subset of predictors. In other words, given any two impulse control values (measured by STEP Listening scores for Tables 3.03 and 3.05, using raw scores and stanine values respectively, and by peer nominations combined in the gestalten Peer-evaluated Impulsivity, P-9 on p. 2-12, for the factor variable predictors of Table 3.04) and any two levels of intelligent behavior (measured by CTMM Mental Function and factor scores for Convergent Thinking), the criterion difference from one level of intellectual functioning to another is not the same at different points (or places) on the measure of impulse control. In the terminology of Bottenberg & Ward (1963, pp. 69-75), the two independent variables are said to interact. Saunders (1956), of course, has referred to the same concept as "moderator variables." Whiteside (1964) has explained his method for selection of the measure to represent the catalyst (pp. 23-31).

Answers to questions posed about teacher evaluations (GPA).- The answers to all three questions posed at the beginning of Chapter III apparently are in the affirmative with certain minor reservations. Table 3.01 on p. 3-9 clearly show that all but one measure postulated to represent theoretical categories make a statistically significant contribution in the presence of all the other variates considered in the original full model (2) for multivariate analysis of the regression of senior high-school GPA as a criterion measure of academic talent regressed upon theoretically relevant predictors. The one exception was CYS Negative Social Orientation, an attitude scale ($E_{a.b}$) described as variable no. 111 on p. A-73 of Appendix A and selected as a possible instrument to represent "Authoritarian Socialization" and renamed "Alienation Syndrome" with descriptions on pp. 1-17 and 2-12 in the preceding chapters. Apparently a small set of five predictor variables employing data available in the ninth-grade year could be useful in predicting academic achievement over the senior high-school years in the real-world situations of the public schools as demonstrated in Tables 3.02 to 3.05 inclusive. The cross-validation findings discussed in an earlier paragraph and shown in Tables 3.03, 3.04, and 3.05, would lead one to believe the stability (usefulness) of the small set of five predictor variables would hold reasonably true (in terms of magnitudes of RSQ values and a limited number of "misses") when regression information from one community (beta weights for variates) is applied to a new location. The statistically significant decreases upon cross-validation still leave RSQ's of a large magnitude when regression weights from one population are applied to another.

Conclusion

The multivariate psychological model used throughout this report as the theoretical basis for studying human behavior has again proved to be a profitable approach. The model has been readily expressed by the multiple linear regression technique for purposes of hypothesis testing and for prediction studies. Merwin and Gardner (1962, p. 47), in a review of aspects of achievement testing, pointed out "that high priority should be given to research that will provide greater understanding of the relationships... between achievement testing and such variables as aptitude, motivation, interest, social relations, and personality." What was done with regard to studying teacher evaluations of academic achievement as indicated in this chapter can be replicated in terms of achievement testing or any other scaled criterion. From the beginning the Human Talent Research Program has attempted to consider the relevance of several different aspects of behavior to the study of a particular dependent variable--in much the same way that Merwin and Gardner seem to have suggested. The results not only support the transformation of dyadic theory to a model for the explanation and the prediction of some forms of subsequent behavior in terms of antecedent measures but also bears out much of Lavin's analysis of The Prediction of Academic Performance for the Russell Sage Foundation (1963), particularly Chapter 7 (pp. 151-171) as well as the catalytic effects of impulsivity and impulse control (pp. 81-83). Parenthetically, the measurement of impulsivity by STEP Listening lends credence to the concept of affectivity vs. affective-neutrality in Parsons & Shils' Toward a General Theory of Action.

Several conclusions follow from the discussion in the preceding section. One source of satisfaction stems from Jennings' rather sophisticated interpretation of the meaning of RSQ values or R^2 as a ratio, especially when an intuitive approach is appreciated in comparison with more conventional methods. The contra-indication (or contradiction) of Horst's somewhat negative approach to evaluating significance in multivariate analysis (in Cattell's recent Handbook, 1966, pp. 139-140), particularly cross validation on the grounds of it being "a purely empirical approach" and "we never have enough cases," elicits ambivalent feelings in members of the HTRP group who have appreciated his work and the guidance supplied by his several books, articles, and monographs. There are, of course, feelings of gratification for the confirmation of the place of "curvilinear" forms, such as the squared ninth-grade GPA's as a variable in the set of predictors, and the demonstration of the "catalytic" effect of a postulated measure of impulse control, STEP Listening, as a moderator variable in an interaction form to be incorporated in the predictor set.

One of the most rewarding outcomes of this study, and indeed of the whole HTRP undertaking has been the successive verifications of the dyadic interaction approach to the study of human development and behavior. This approach, which takes account of the reciprocal interaction between two or more individuals (that is, in dyadic or polyadic systems) permits the view that affecto-cognitive development, personality, and social behavior (including that which is evaluated as talented) are merely facets of the same set of phenomena. Moreover, a logical consequence of the organization of central processes stemming from reciprocal stimulation is that Alpha learns to act in terms of expectancies about the probability of supportive or nonsupportive responses of Beta(s) to his behavior when evaluated. As related in Chapter II of an earlier report (McGuire, et al, 1968), the approach began as a heuristic device; that is, "a set of pegs upon which to hang and to interrelate our thoughts" so that concepts could develop into principles and a guide was at hand for formulating multivariable research in either naturalistic or experimental contexts.

With the HTRP reports upon talented behavior and the supporting publications inquiring into the development of intelligent behavior accomplished in collaboration with Rowland (see Chapters II and V of McGuire & Associates, 1968, as well as Chapter I of the present manuscript) the original heuristic device, really a schema-with-corrections, has been transformed into what Abraham Kaplan[3] (1964, pp. 327-336) terms "a pattern model" which, he believes, "may more easily fit explanations in early stages of inquiry" (p. 332). The pattern model, evaluated in the light of its development for the HTRP, for teacher education, and for Area II "Developmental-Social Psychology" (Human Development) as an integral part of the graduate program as well as an area of concentration in the Department of Educational Psychology, is a dyadic interaction theory of the development of intelligent, talented, and creative behavior (sets of capabilities desired when the educational encounter is viewed as planned intervention into human development and behavior, and when teaching is defined as the controlled introduction of discontinuities into ongoing behavior which, in turn, indicate the accomodation of guiding schema to permit assimilation of experiences).

As demonstrated in this manuscript, a pattern model encourages the process of discovery and, with experience, familiarity can come into play; "the known is identified with something known... in terms of its place in a network of relations" (p. 333). To be specific, this final report and any subsequent publications are intended to demonstrate a pattern model, such as the one which represents dyadic interaction to this point in time, functions only throughout inquiry to guide the search for data and its ordering to yield meanings, then to be translated by the educator, counselor, and school psychologist into a frame of reference for carrying out their professional responsibilities. To re-examine the theory, the basic assumptions which underlie the model, certain integrating principles, and some of the emergent understandings please return to the abstract of this final report which begins on page 1-33 of Chapter I.

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[3] Abraham Kaplan, a noted philosopher of science now at Michigan, was a professor at UCLA when David G. Ryans, then Chairman of the Department of Educational Psychology at Texas, invited him to visit UT during the formative HTRP years. We deeply appreciate the insights into a philosophy of behavioral science acquired from Professor Kaplan, particularly from his recent book, The Conduct of Inquiry (1964), which received a positive review in Contemporary Psychology (1967, 12, 414-415), where his attention to the "context of discovery" has been appropriately appreciated for being relevant to behavioral science instead of the "context of justification" employed by R. W. Braithwaite in his Scientific Explanation (Cambridge, 1953).

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APPENDIX A

Appendix A supplies information to clarify certain questions which may arise as a reader encounters the preceding "Dimensions and Criteria of Talented Behavior." Insofar as possible, the Appendix summarizes the data gathered from and about young people who participated in the Human Talent Research Program (HTRP) from 1957 to 1963 when the majority graduated from high school. What were the characteristics of the four small cities and surrounding counties wherein the HTRP subjects were located and what changes were these communities undergoing which probably influenced the young people as they completed their high school years? What instruments were used to obtain data from the HTRP subjects during the longitudinal study? In other words, what operations were employed to define the HTRP variables and to yield measures representing inter-individual differences among subjects as well as intra-individual differences within a person from one time to another? When were the measures administered, to whom, and what basic data are available for further inquiries? What was the nature of distribution statistics for each administration of an instrument and, where applicable, what were the relationships among measures between grades VII and IX, VII and XII, IX and XII, respectively? Thus Appendix A has six sections:

I Four Texas Communities in Transition A-2 to A-11

II Casualties in the Cultivation of Talented Behavior A-12 to A-56

III Description of Variables A-57 to A-78

IV Basic Data Tables A-79 to A-107

V Analysis of Data A-108 to A-129

VI Data for a Comparative Study of Adolescent Value-Attitudes A-130 to A-147

APPENDIX A

Section I

FOUR TEXAS COMMUNITIES IN TRANSITION

While the populations of the Human Talent Research Program were completing their elementary school education and going on through the secondary school years, the very communities in which they lived were reshaping themselves as a consequence of the world-wide emergence of a new era in the lives of human beings.

The four communities, each in its own way, apparently were catalyzed into becoming something more than an agricultural or a distribution center as the result of forces and processes bringing about changes which few of the HTRP subjects, their parents, or their teachers possibly could recognize. In retrospect, the indicators of an emergent new era which were having an impact upon the four HTRP communities as well as others in Texas and the United States probably may be designated as follows:

(a) an incredible explosion of knowledge taking place not only in the United States but all over the world,

(b) the introduction of automation and the electronic computer--pools of persons either having to acquire new skills or find themselves "out of place" as the new era emerges,

(c) new systems of energy transformation and the utilization of materials in ways mankind had not believed possible,

(d) simpler societies losing the status of colonies and "leap-frogging into the future;" for example, shipping oil and other materials into the United States.

The data presented in this section illustrate our inference that each of the four communities was in a state of transition from being a center for a primary industry during the period when the HTRP students completed the elementary grades and attended junior and senior high schools. The research team believes that Tables A.01 summarizing population changes, A.02 presenting comparative data, and A.03 which concentrates upon characteristics by county, taken together, indicate the nature of emergent communities which no longer are centers for a primary industry such as agriculture. For the convenience of the reader, each of the communities has been given a pseudonym to be employed in this and previous reports; namely, (a) Ashton in Albert County, (B) Bandana in Bolivar County, (C) Centerville in Center County, and (D) Dune-

TABLE A.01

Population Changes in Cities and Counties by Decades, 1930 to 1960

City or County	1930	1940	U.S. Census 1950	1960	Est. 1962
			Cities		
Ashton (A)	15,700	17,200	20,100	25,000	25,100
Bandana (B)	15,100	15,200	19,200	20,300	20,750
Centerville (C)	7,400	11,500	16,100	33,000	35,200
Duneside (D)	1,300	2,050	5,500	8,800	9,000
			Counties		
Albert County (A)	65,200	69,500	70,400	73,000	73,050
Bolivar County (B)	50,500	51,300	39,900	34,450	34,500
Center County (C)	20,000	23,700	31,200	46,400	48,700
Dalton County (D)	5,300	5,900	9,200	15,500	17,300

TABLE A.02

Comparative Data on Four Texas Communities

	A Ashton Albert Co.	B Bandana Bolivar Co.	C Centerville Center Co.	D Duneside Dalton Co.
Number of Farms in Counties over a Decade				
Number in 1956	3,600	3,200	3,600	330
Number in 1959	2,350	1,900	2,200	260
Number of Service Establishments, 1958				
In Cities	355	150	300	50
In Counties	175	60	265	35
Average Monthly Employment, 1962				
County Total	11,800	4,500	7,900	4,450
Mining (oil)	370	260	785	75
Construction	900	160	850	1,000
Manufacturing	5,000	1,900	1,250	2,250
Trade	3,000	1,200	2,800	670
Distribution of Labor Force on April, 1962				
Labor Force	26,150	12,125	15,100	7,130
Manufacturing	5,350	1,920	1,500	2,375
Non-Manufacturing	18,500	7,710	11,630	4,000
Agriculture	1,520	1,895	1,370	505
Unemployed	780	600	600	250
Retail Trade Establishment, 1958				
Located in City	590	450	430	185
Located in County	290	300	100	120
Motor Vehicle Registrations, 1962				
County	43,050	18,350	26,400	8,800

TABLE A.03

Characteristics of Population by Counties

Characteristic	Albert Co.*	Bolivar Co.	Center Co.	Dalton Co.
Total Population	73,000	34,400	46,500	16,600
Anglo-American	66,400	24,500	31,750	11,650
Latin-American	200	1,400	10,750	4,150
Negro-American	6,400	8,500	4,000	800
Males	35,700	16,400	22,750	8,500
Females	37,300	18,000	23,750	8,100
Median Age (Years)	32.1	36	25	21.7
School Enrollment	15,691	7,700	11,700	4,200
Employed Labor Force	24,813	12,400	15,700	5,150
No. of Families	20,016	9,300	11,200	3,750
Median Income	4,264	3,247	4,805	5,350
Deposits ($1,000's)	95,000	41,800	121,400	24,000

*Two incorporated cities, Ashton and Borden, are in Albert County.

side in Dalton County. Some of the census figures have been altered slightly to preserve the anonymity of the communities who elected to enter into the research agreement. All alterations have been relative so that the data presented herein are substantially correct.

The physical and economic changes in the four HTRP communities have produced an increasingly complex setting in which the boys and girls involved in the program found it necessary to grow up and learn to live. From predominantly agricultural communities to industrial complexes, from relatively stable populations to highly mobile families and communities, from small to large populations, each of these shifts produced new friends and resulted in the displacement of many former peers. Whether or not the increasingly changing populations and the increasingly complex community setting may be regarded as moderating factors to be represented in the catalytic theoretical model would be a matter of judgment. To permit the reader to make his own evaluation, a more detailed examination of each community might be apropos at this stage of the report.

The four communities in the Human Talent Research Program--Ashton, Bandana, Centerville, and Duneside--possess the usual similarities and differences residing in geography, ethnicity, and degrees of industrialization. All four communities have, during the life of the HTRP, found themselves in a period of transition into an ever-increasing industrialization and a consequent lessening of dependence upon agriculture and/or ranching. Add to this a constant movement of segments of their populations to larger, more urban centers, and the picture of a period of transformation becomes even clearer. Although the schematic "community block" (Fig. A.01) still represents their social organization, details differ from one place to another.

No community can be said to conform to the concept of modern suburbia; none of the four serves as a bedroom community for a larger city. In other respects, however, each of the four have undergone "suburban transformations": (1) increased residential areas, (2) increased industrial and retail shopping centers, (3) federally assisted projects for the extension and improvement of water, sewer, and power facilities, and (4) increased highway services leading to rapid transportation between neighboring population centers. At the same time, transportation has changed: railroads have declined; lower-class people have become bus passengers; middle-class people are no strangers to the airliner. Many students, especially during the senior high school years of the HTRP, rode to school by bus. A good number of these community changes took place in their entirety during the lifetime of the Human Talent Research Program.

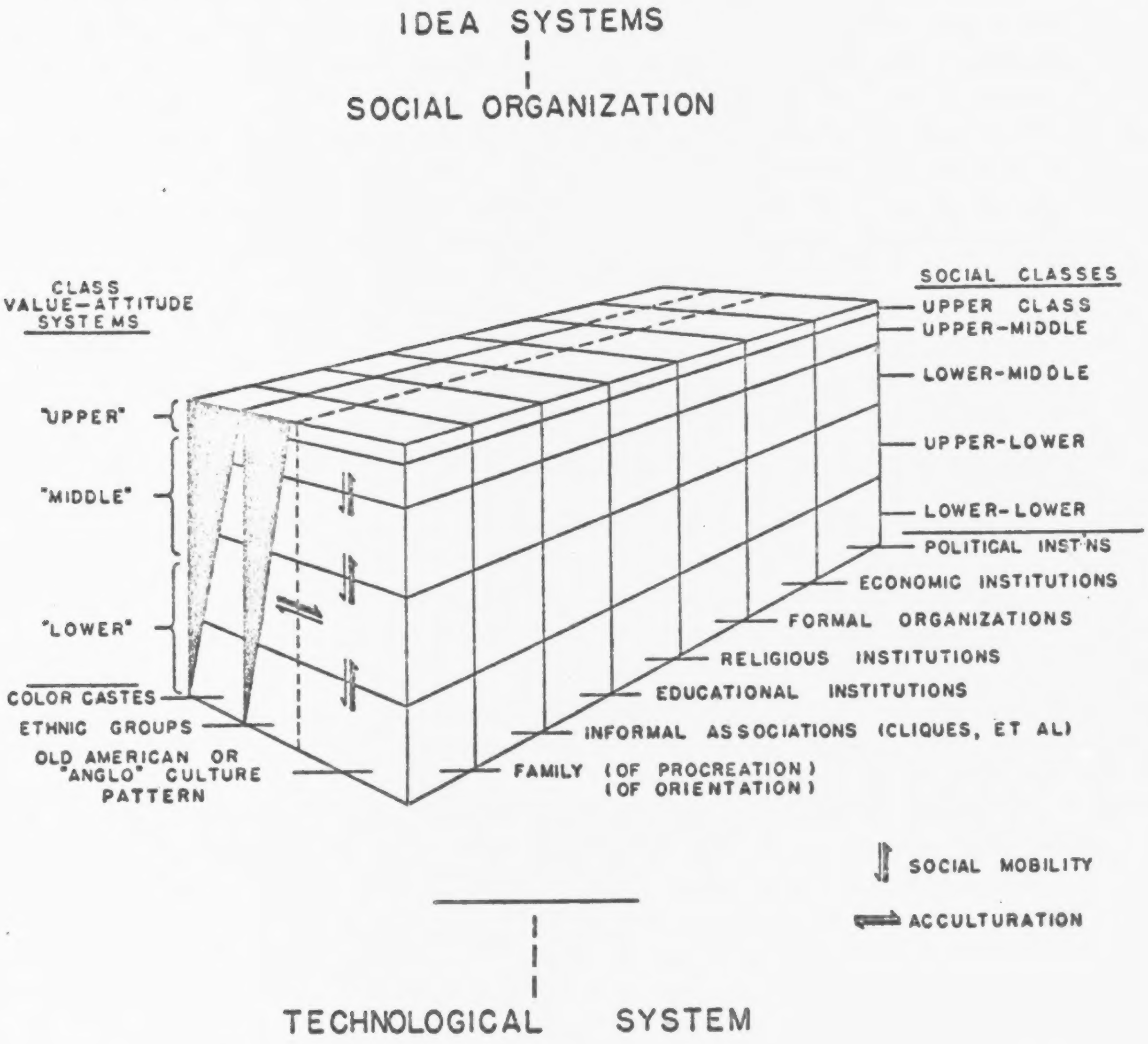
IDEA SYSTEMS
SOCIAL ORGANIZATION
CLASS VALUE-ATTITUDE SYSTEMS
"UPPER"
"MIDDLE"
"LOWER"
COLOR CASTES
ETHNIC GROUPS
OLD AMERICAN OR "ANGLO" CULTURE PATTERN
SOCIAL CLASSES
UPPER CLASS
UPPER-MIDDLE
LOWER-MIDDLE
UPPER-LOWER
LOWER-LOWER
POLITICAL INST'NS
ECONOMIC INSTITUTIONS
FORMAL ORGANIZATIONS
RELIGIOUS INSTITUTIONS
EDUCATIONAL INSTITUTIONS
INFORMAL ASSOCIATIONS (CLIQUES, ET AL)
FAMILY (OF PROCREATION) (OF ORIENTATION)
SOCIAL MOBILITY
ACCULTURATION
TECHNOLOGICAL SYSTEM

Figure A.01 Schematic Diagram of a Community

A Schematic Diagram. - The elements of a situation often can be represented by a schematic diagram which indicates major variables and their relationships. The diagram presented in the figure above represents how one may conceptualize the parts of a community as they fit together.[1] It is a frame of reference which helps one identify the probable places of families in a community.

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[1] The diagram first appeared in an article by Carson McGuire, "Social Stratification and Mobility Patterns," Amer. sociol. Rev., 1950, 15, 195-204. A fuller account of the community structure may be found in Carson McGuire, "Social Status." In Edw. G. Olsen, School and Community (2nd ed.), New York: Prentice-Hall, 1954. Pp. 88-110.

There are differences in population growth, median ages of populations, median incomes, employment statistics, and bank deposits which are noticeable in the three initial stages of this section of the Appendix. As one example of differences, the median age of the population of Duneside is 21.7 years as compared with Centerville at 25.0, Ashton at 32.1, and Bandana at 36.0 years. Clearly, Duneside is an emerging community characterized by families with young children. Unless there is an opening in the fast-growing industrial complex at Duneside, young people tend to move away from such a community.

Two other differences are deemed of sufficient importance to be mentioned specifically. The first is that of ethnicity; the first percentage figure given (for the entire community in each case) is for Anglo-Americans, the second for Latin-Americans, and the third for Negro-Americans in each of the four communities:

Ashton, 90% Anglo, less than 1% Latin, 9% Negro
Bandana, 70% Anglo, less than 5% Latin, 25% Negro
Centerville, 68% Anglo, 23% Latin, 9% Negro
Duneside, 70% Anglo, 25% Latin, 5% Negro.

The figures for ethnicity among school populations may vary somewhat from total community percentage.

Median incomes in the four counties, not necessarily in alphabetical order, are $3,247, $4, 264, $4, 805, and $5, 350. In the same order as that employed for median incomes, bank deposits for the four counties, Albert, Bolivar, Center, and Dalton, show (in millions of dollars) 41.8, 95, 121.4, and 24.

Ashton

The 25,000 people of Ashton attend 36 churches. The most representative congregations are Baptist, Methodist, Christian, Church of Christ, Episcopal, Roman Catholic, and Presbyterian.

Approximately 50 manufacturing concerns are located in or adjacent to Ashton. The relatively new plants include those which produce tabulating punch cards, pharmaceutical products, aluminum extrusions, processed foodstuffs and clothing. Other plants are concerned with the production of aluminum truck bodies, boats, and canoes. Employers represent their employees as being 33 per cent skilled, 40 per cent semi-skilled, and 27 per cent unskilled.

Industry has been attracted by a community-minded attempt to foster a healthy, diversified industrial development program with plants located in a very attractive Industrial Park. Factors contributing to the industrial development appear to be cheap electric power plus natural gas, as well as a labor force of 26,000 persons from Ashton and surrounding Albert County. As a consequence of its industries, businesses, and services, Ashton usually has less than three per cent unemployment each year.

The city of Ashton is served well in the area of transportation. The five railrodad, 10 truck lines, buses (interstate and local), and a small municipal airport combine with an arterial highway and numerous local market roads to provide easy access to the city.

The Ashton independent School District had nine elementary schools, one school for the handicapped, two junior high schools, and two senior high schools. These schools, not as yet integrated in 1963 when the data-gathering part of HTRP was completed, served 5,800 scholastics with a faculty of 290 teachers.

Bandana

The county seat of Bolivar, Bandana is nearer "East" Texas than any of the other three HTRP communities. The estimated 1962 population was 20,750 of which some 25 per cent were Negro. The Bandana population probably is the most stable of the four HTRP locales as seen in Table A.01.

The community is a wholesale distribution center for a total trade territory population of over 250,000 people. In Bolivar County itself, agriculture still forms the leading source of "trade distribution money"; e.g., the county produces from 20-30,000 bales of cotton annually. Petroleum is second in monetary importance, and assorted small industries are third. Just as in Ashton, an Industrial District has been created outside the City limits to foster industrial growth. A tract of 280 acres has been so designated and set aside for continuation of the industrial development. Four railroads and five motor freight lines are available to serve industry and the community at large for transportation needs.

The people belong to 36 church congregations, mostly Protestant. Two hospitals, four clinics, and a city-county health unit serve the health needs of the county.

A junior college, supported by both county and state funds and fully accredited by the Southern Association of Secondary Schools and Colleges, is attended by almost 1,000 students. A parochial school has an enrollment of over 100 pupils. The public schools of Bandana have an enrollment of approximately 5,000.

School census figures (summarized in Tables A.04, A.05, and A.06, pp. A-15 to A-17) show a very slow but steady increase in enrollment during the years the HTRP student attended public schools.

Two junior high schools for white pupils serve as feeders for the one white senior high school; during the period under HTRP study, Negro pupils attended a segregated junior-senior high school. As in other communities of East Texas, the schools are now in process of becoming integrated.

Centerville

One of the oldest towns in the State of Texas, extending back to the days of the Republic, Centerville has maintained its early role as a cattle center. In addition, however, the area is engaged in petroleum refining, production of petro-chemicals, metal extracting, cottonseed processing, food processing, and garment making.

The diversification of Center County's occupational picture is reflected in certain aspects of its growth curve. In 1950, Centerville was third in size among the HTRP communities. By 1960, it was the largest of the four. Adequate transportation facilities have helped to foster the rapid industrialization of Centerville and Center County.

The community has numerous churches. In addition to the usual Protestant congregations, a substantial number of people are members of the Roman Catholic Church. Hospitals and medical centers make available more than average health care to the population.

Centerville is proud of its schools. Elementary schools in all parts of the growing city, a number of parochial high schools, three public junior high schools together with one comprehensive senior high school, and a junior college serve the community's youth. School enrollment (public) more than doubled in the period 1950-1962. HTRP participants attended school during the years of rapid growth. In addition to this factor of growth and resultant change, the attraction of many "out of state" families to new and growing industries resulted in a changing population for both the schools and the city. A greatly changed population and greatly varied expectancies were encountered by HTRP students during the years of the study.

Without reference to the approximately 1,000 students enrolled in the public junior college, the population diversity of Centerville's schools is interesting. Approximately 64 per cent of Centerville's public school enrollment is Anglo-American (including families of European ethnic origin), 26 per cent Latin, and 10 per cent Negro. The HTRP Negro-American students had little opportunity to be in school with non-colored age-mates since integration began in the ninth grade. Nevertheless, the schools now are moving quickly toward integration.

106

Duneside

Duneside is the smallest community participating in the Human Talent Research Program, but it is one of the most rapidly growing ones. The population has approximately doubled during the HTRP years. About 70 oer cent of the present population is Anglo, about 25 per cent is Latin, and the remaining five per cent is Negro.

A recently acquired metal processing plant, a chemical concern, and oil and gas resources have added to the production of cotton, maize, rice, and cattle to contribute heavily to the economy of the city and to surrounding Dalton County. Transportation facilities include the usual railroad and motor services together with increasing dockage space and channels for deep sea boats as well as access to air transportation. They provide for easy, economical access to and dissemination of the local agricultural and industrial products.

The community has a large, modern, and almost (spacewise) adequate hospital. Thirteen churches, recently constructed hotels and motels, some private air fields, a newspaper, and a radio station complement Duneside's community services.

The school system is organized on a county unit basis and is composed of eight elementary schools, three junior high schools, and one senior high school. A school plant expansion program has been in operation for ten years in preparation for a mushrooming growth which has now carried the pupil enrollment to almost 5,000. A point of pride for school leaders is that their industrial arts program has been greatly expanded to prepare students who cannot attend college to enter some trade upon completion of high school. Unlike the other communities, the colored HTRP boys and girls have attended junior and senior high schools along with Anglo-American and Latin-American age-mates.

APPENDIX A

Section II

CASUALTIES IN THE CULTIVATION OF TALENTED BEHAVIOR

Section II replaces the customary presentation of population data to complete the demographic picture of four communities in transition. Tables A.04 to A.15, pp. A-15 to A-27, represent the kinds of information currently available about boys and girls attending secondary schools if one keeps careful records but does not investigate those who "withdraw" from school during the academic year or at the conclusion of a vacation period. Neither the HTRP nor the participating school systems had the funds or the personnel to follow them up to determine which ones actually had "transferred" to other schools and which ones were known "school dropouts" as well as what happened to them.

Under the subheading "The Numbers Game," which follows the introductory paragraphs of this section, some ideas are presented about the twelve tables. Questions are raised with reference to "invisible dropouts" about whom there is little information, even in the much-discussed Coleman Report on Equality of Educational Opportunity (1966). Fortunately one of the HTRP staff members undertook a dissertation upon male "Delinquents and Dropouts" from which information has been drawn for pages A-18 to A-30, including Table A.16 classifying the male population he was permitted to study! A third subheading, "Age-Mate Acceptance in Adolescent Societies" (pp. A-30 to A-40), illustrated by Figures A.02, A.03, and A.04, shows how boys and girls fit into age-graded adolescent societies and are influenced by experiences therein over time. The last subheading for this section, "Simulation of Grouping for Instruction" with Figure A.05 to depict a method of grouping students for instruction and Tables A.17 to A.20 to represent the consequences of typing young people, begins on page A-40. Taken together, the four parts of this section form a working paper for a monograph upon "Casualties in the Cultivation of Talented Behavior."

The word "casualties" refers to loss in numerical strength from an initial population, military or otherwise, attributed to reasons operating over time and/or under certain circumstances. The meaning of any concept of "casualties," however, depends upon the set of assumptions one makes about the nature of "human talent(s)." When the Social Science Research formed a Committee on the Identification of Talent in 1951, the emphasis appeared to be upon the mineral model wherein the search was for "talent" in the sense of an "ability" or, quite often, high "intelligence."

The terms "talent," "ability," and "intelligence" all were employed in the nominal sense (as a noun) usually reifying the abstract concept to the point that many people attributed to each of them an unidimensional existence which could be measured with suitable tests. The viewpoint still persisted into 1960 when the president of a leading advertising firm concluded an address, "I ask only that we look for talent and excellence as avidly as we look for... many of our less valuable natural resources...." Then he went on to charge educators, ministers, businessmen, unions, and organizations with the responsibility of joining "in a mammoth talent hunt to uncover (the) treasure of brains which... is hiding in unlikely places all over America" (Wolfle, 1960). The assumption that "intelligence" is fixed and that "talents," "abilities," and the course of development are predetermined for each individual born into a society or family comprising one of its subcultures still persists. All too often HTRP staff members have planned learning episodes, using expository and/or discovery methods, to counter traditional conceptions of intelligence, talent, and abilities and their relationship to experience only to encounter somewhere along the way, "You *really mean* that intelligence can be changed!"

The final report of the SRCD Committee, *Talent and Society: New Perspectives in the Identification of Talent* (McClelland, Baldwin, Bronfenbrenner, & Strodtbeck, 1958), reflected the change in *zeitgeist* postulated in the second HTRP report (McGuire & Associates, 1968) and documented by Rowland & McGuire (1968a). Although McClelland *et al* began their volume with a somewhat traditional discussion of issues about "the identification of talent" (pp. 1-28), they concluded, "basically ability refers to the adaptiveness of behavior" (p. 235) and that "the 'talent' is in the combinations of a particular person with a particular situation" (italicized, p. 236). This, of course, is congruent with the *agricultural model* and notions about the cultivation or development of talented behavior, intelligent behavior, and the multidimensional nature of human abilities proposed in the introduction and demonstrated in the study, "Dimensions and Criteria of Talented Behavior." Probably a much clearer statement of interlocking concepts appears in *Research Trends and Needs in Educating the Gifted: A Critique* (Gallagher, 1964, OE-35056), the report of a Research Conference on Gifted Children sponsored by the U. S. Office of Education, September 25-29, 1962, in which the Principal Investigator was one of the participants.

The concept of "casualties in the cultivation of talented behavior," then, should be considered in terms of the "agricultural" not the "mining" model for the study of *talented behavior(s)*, the emphasis being upon development (planned intervention) rather than mere identification ("the self-fulfilling prophecy" so well documented by Rosenthal & Jacobsen, 1968a, 1968b). Despite his use of

109

linguistic conventions, the position taken by John W. Gardner in his little book on Excellence (1962) is most appropriate when one interprets the tables in this working paper. His concern is with the social context in which excellence, particularly "intellectual talent," may survive or be smothered.

> The importance of education in modern society is not limited to the higher orders of talent. A complex society is dependent every hour of every day upon the capacity of its people to read and write, to make complex judgments and to act in the light of fairly extensive information.... Schools not only educate youngsters--they sort them out. When the need for talent is great--as it is today--this sifting becomes fairly rigorous (p. 35).

Later, following up this theme, Gardner is quite concerned about the "late bloomer" holding that "early separation of the very gifted and the less gifted violates our principles of multiple chances" (p. 69), a statement borne out by Tables A-18 to A-20 (pp. A-47 to A-49) on "student types."

The Numbers Game

In 1963, the year in which a majority of the HTRP students graduated from high school, the Research Division of the National Education Association reported an often-quoted "Ranking of the States" with reference to high school graduation (Brembeck, 1966, p. 510). Comparing the gross number of high school graduates in 1962 as per cent of 1957-58 eighth-grade enrollment, 70.6 per cent in the 50 states and the District of Columbia received high school diplomas. The percentages varied from 92.3 per cent in Wisconsin, 88.2 in Minnesota, and 86.4 in California, through 67.9 in Oklahoma and 60.6 in Texas, to 55.0 in Alabama, 51.9 in Virginia, and 51.8 in Georgia. Consulting Tables A.04, A.05, and A.06, showing 1,792 originally enrolled in Grade VII (1957-58) and 1,184 as the total Grade XII enrollment in the four HTRP communities for the graduating year (1962-63), the usual "numbers game" indicates that 66.07 per cent reached the graduation year of high school in the four locations. The percentages appear to be 81.3 per cent in Ashton, 64.0 in Centerville, 62.2 in Bandana, and 53.8 in Duneside. The proportion of graduating seniors who were in the original HTRP population, however, was only 44.6 per cent, ranging from 53.6 in Ashton to 42.5 in Centerville, 41.7 in Bandana, and 40.4 in Duneside. The tables would lead one to infer a great deal of population mobility ("new students enrolled" and "transfers" out of the school system) with an unknown number of school dropouts. The greatest number probably occurred between the ninth and tenth

TABLE A.04

Population Data from the Human Talent Research Program Grade VII (1957-58) to Grade IX (1959-60)

Classification	Sex Role	School Community Locations A	B	C	D	Total
Original HTRP Enrollment in Grade VII (1957-58)						
	Boys	220	181	374	181	956
	Girls	209	171	310	146	836
Enrolled		429	352	684	327	1792
Observed Grade IX Enrollment (1959-60)						
	Boys	242	144	325	163	874
	Girls	214	146	278	113	751
Enrolled		456	290	603	276	1625
Original HTRP Students Continuing to Grade IX (1957-58 to 1960-61)						
	Boys	185	116	261	129	874
	Girls	173	126	224	97	620
Enrolled		358	242	485	226	1311
Original HTRP Student Dropouts or Transfers*						
	Boys	34	65	115	53	267
	Girls	37	45	84	48	214
Enrolled		71	110	199	101	481
New Students Enrolled from Grade VII to IX (1957-58 to 1960-61)						
	Boys	57	28	64	34	183
	Girls	41	20	54	16	131
Enrolled		98	48	118	50	314

*Texas schools did not, and still do not, have a pupil accounting system which permitted a record of boys and girls who left school as "dropouts" and those who were transferred to another school either in the same community, or to another either within or outside of the state. After the passage of ESEA-1965, however, the Texas Education Agency has a task force working upon the problem since the reduction of school-leaving (or decrease in dropouts) is going to be an index of the relative efficacy of Title I programs initiated in local school districts.

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TABLE A.05

Population Data from the Human Talent Research Program
Grades IX (1959-60) to XII (1962-63)

Classification	Sex	School Community Locations				Total
		A	B	C	D	
Initial Enrollment in Grade IX (1959-60)						
	Boys	242	144	325	163	874
	Girls	214	146	278	113	751
Enrolled		456	290	603	276	1625
Enrollment in Grade X (1960-61)						
	Boys	161	112	184	107	564
	Girls	150	109	176	75	510
Enrolled		311	221	360	182	1074
Original HTRP Subjects Continuing from Grades IX to X (1959-60 to 1960-61)						
	Boys	124	105	156	86	471
	Girls	130	106	152	64	452
Enrolled		254	211	308	150	923
Student Dropouts or Transfers, Grades IX to X (Summer, 1960)						
	Boys	18	39	169	77	303
	Girls	84	40	126	49	299
Enrolled		102	79	295	126	602
Enrollment in Grade XII (1962-63)						
	Boys	180	121	228	95	624
	Girls	171	98	210	81	560
Enrolled		351	219	438	176	1184
Observed HTRP Students Continuing from Grades IX to XII (1957-58 to 1962-63)						
	Boys	136	86	179	77	478
	Girls	135	72	152	60	419
Enrolled		271	158	331	137	897
Student Dropouts or Transfers, Grades IX to XII (1959-60 to 1962-63)						
	Boys	106	58	146	86	396
	Girls	79	74	126	53	332
Enrolled		185	132	272	139	728
New Students Enrolled from Grades IX to XII						
	Boys	44	35	49	18	146
	Girls	36	26	58	21	141
Enrolled		80	61	107	39	287

TABLE A.06

Population Data from the Human Talent Research Program Grade VII (1957-58) to Grade XII (1962-63)

Classifications	Sex Role	School Community Locations				Total
		A	B	C	D	
Original HTRP Enrollment in Grade VII (1957-58)						
	Boys	220	181	374	181	956
	Girls	209	171	310	146	836
Enrolled		429	352	684	327	1792
Observed Grade XII Enrollment (1962-63)						
	Boys	180	121	228	95	624
	Girls	171	98	210	81	560
Enrolled		351	219	438	176	1184
Original Students Continuing to Grade XII (1957-58 to 1962-63)						
	Boys	108	79	154	70	411
	Girls	122	68	137	62	389
Enrolled		230	147	291	132	800
Original HTRP Student Dropouts or Transfers						
	Boys	112	102	220	111	545
	Girls	87	103	173	84	447
Enrolled		199	205	393	195	992
New Students Enrolled from Grade VII to XII (1957-58 to 1962-63)						
	Boys	72	42	74	25	213
	Girls	49	30	73	19	171
Enrolled		121	72	147	44	384

grades and in learning to cope with teacher and other expectations in Grades X and XI.

Tables A.07 to A.15 supply the kinds of categorized enumerative data seldom found in any demographic study of school populations. Two kinds of questions are unanswered and probably will remain so until follow-up systems are developed to trace "transfers" and to identify the actual "dropouts" and what happens to them. Discussions at the state level indicate questions about transfers and dropouts as casualties await a time when information can be computerized and systems linked to determine the number and characteristics of "invisible dropouts." Meanwhile, the present tables provide a rare set of cross-checked longitudinal demographic enumerative data upon an age-grade of girls and boys in four changing city communities with culturally diverse populations. The kinds of data available on all except those categorized "Unknown" (enrolled but information lacking for Tables A.07 to A.12) is summarized in basic data tables A.21 and A.22 to be found in Section IV of the working papers forming this Appendix A. The HTRP team has looked in vain for comparable data from PROJECT TALENT (Flanagan et al, 1962; Lohnes, 1966; Shaycroft, 1967), the 1966 Coleman Report, and the 1967 report of the U. S. Commission on Civil Rights.

Following summary Tables A.04 to A.06, reference to which already has been made, the subsequent tables supply enumerations according to cultural background (A.07), family status (A.08), and level of mental function (A.09). Notice that only 800 boys and girls remained in the graduating classes of the high schools in the same four communities wherein 1,792 of them were located in the seventh grade and from which 992 either had "transferred" or become one of the unidentified "hidden dropouts" (with the exception of the males discussed in the next subsection). Tables A.10 to A.12 present the same kinds of information about the 1,625 males and females who were enrolled in the ninth grade (including 314 "newcomers," Table A.04), the 897 of them enrolled to high school graduation, and the 728 who either were "transfers" or "school dropouts" from grades nine to twelve. To complete the record, Tables A.13 (Anglo-American backgrounds), A.14 (Latin-American), and A.15 (Negro-American) provide enumeration data on three "disadvantaged populations."

Delinquents and Dropouts

During the late summer and early fall of 1962, a field-worker assessed the fifth-year status of students in the original HTRP population with reference to continuation in school and legal juvenile court action. Kelly (1963) was concerned with the possible relationship of delinquent and school-dropout behavior to

TABLE A.07

Distribution of Original HTRP Population in Grade VII (1957-58) Who Did and Did Not Continue to Grade XII (1962-63) By Cultural Background, Sex Role and Community Location.

Cultural Background	Sex Role	School Community Locations A	B	C	D	Total
Enrolled Grade VII When HTRP Began (1957-58)						
Anglo	Boys	185	130	228	131	674
	Girls	178	116	164	104	562
Latin	Boys	5	1	87	35	128
	Girls	1	2	81	29	113
Negro	Boys	8	35	26	5	74
	Girls	16	42	33	7	98
Unknown	Boys	22	15	33	10	80
	Girls	14	11	32	6	63
Sub-Total	Boys	220	181	374	181	956
	Girls	209	171	310	146	836
	Total	429	352	684	327	1792
Enrolled Grade VII to Grade XII (1962-63)						
Anglo	Boys	101	74	116	58	349
	Girls	115	63	93	46	317
Latin	Boys	1	1	22	10	34
	Girls	0	2	23	11	36
Negro	Boys	0	1	2	1	4
	Girls	1	0	5	3	9
Unknown	Boys	6	3	14	1	24
	Girls	6	3	16	2	27
Sub-Total	Boys	108	79	154	70	411
	Girls	122	68	137	62	389
	Total	230	147	291	132	800
Dropout or Transfer Between 1957-58 and 1962-63						
Anglo	Boys	84	56	112	73	325
	Girls	63	53	71	58	245
Latin	Boys	4	0	65	25	94
	Girls	1	0	58	18	77
Negro	Boys	8	34	24	4	70
	Girls	15	42	28	4	89
Unknown	Boys	16	12	19	9	56
	Girls	8	8	16	4	36
Sub-Total	Boys	112	102	220	111	545
	Girls	87	103	173	84	447
	Total	199	205	393	195	992

TABLE A.08

Distribution of Original HTRP Population in Grade VII (1957-58) Who Did and Did Not Continue to Grade XII (1962-63) By Family Status, Sex Role, and Community Location.

Family Status	Sex Role	School Community Locations				Total
		A	B	C	D	
Enrolled in Grade VII When HTRP Began (1957-58)						
UC-UM	Boys	29	15	27	5	76
	Girls	29	10	22	7	68
LM	Boys	70	29	67	23	189
	Girls	63	29	53	26	171
UL	Boys	49	57	94	70	270
	Girls	57	59	69	54	239
LL	Boys	21	48	51	27	147
	Girls	13	94	47	15	121
Unknown	Boys	51	32	135	56	274
	Girls	47	27	119	44	237
Sub-Total	Boys	220	181	374	181	956
	Girls	209	171	310	146	836
	Total	429	352	684	327	1792
Enrolled in Grade VII to Grade XII (1962-63)						
UC-UM	Boys	21	11	21	3	56
	Girls	19	9	17	5	50
LM	Boys	42	20	31	15	108
	Girls	53	19	36	17	125
UL	Boys	26	27	45	28	126
	Girls	31	24	32	23	110
LL	Boys	5	11	20	12	48
	Girls	2	8	11	5	26
Unknown	Boys	14	10	37	12	73
	Girls	17	8	41	12	78
Sub-Total	Boys	108	79	154	70	411
	Girls	122	68	137	62	389
	Total	230	147	291	132	800
Dropout or Transfer Between 1957-58 and 1962-63)						
UC-UM	Boys	8	4	6	2	20
	Girls	10	1	5	2	18
LM	Boys	28	9	36	8	81
	Girls	10	10	17	9	46
UL	Boys	23	30	49	42	144
	Girls	26	45	37	31	129
LL	Boys	16	37	31	15	99
	Girls	11	38	36	10	95
Unknown	Boys	37	22	98	44	201
	Girls	30	19	78	32	159
Sub-Total	Boys	112	102	220	111	545
	Girls	87	103	173	84	447
	Total	199	205	393	195	992

TABLE A.09

Distribution of Original HTRP Population in Grade VII (1957-58) Who Did and Did Not Continue to Grade XII (1962-63) By Mental Function, Sex Role and Community Location.

Mental Function	Role	School Community Locations A	B	C	D	Total
Enrolled Grade VII When HTRP Began (1957-58)						
High	Boys	33	19	59	19	130
	Girls	31	15	43	11	100
Average	Boys	120	109	185	95	509
	Girls	122	88	160	76	446
Low	Boys	35	34	49	33	151
	Girls	32	48	46	30	156
Unknown	Boys	32	19	81	34	166
	Girls	24	20	61	29	134
Sub-Total	Boys	220	181	374	181	956
	Girls	209	171	310	146	836
	Total	429	352	684	327	1792
Enrolled Grade VII to Grade XII (1962-63)						
High	Boys	16	13	35	12	76
	Girls	23	5	27	9	64
Average	Boys	71	60	91	47	269
	Girls	74	53	68	37	232
Low	Boys	11	3	11	7	32
	Girls	14	7	17	10	48
Unknown	Boys	10	3	17	4	34
	Girls	11	3	25	6	45
Sub-Total	Boys	108	79	154	70	411
	Girls	122	68	137	62	389
	Total	230	147	291	132	800
Dropout or Transfer Between 1957-58 and 1962-63						
High	Boys	17	6	24	7	54
	Girls	8	10	16	2	36
Average	Boys	49	49	94	48	240
	Girls	48	35	92	39	214
Low	Boys	24	31	38	26	119
	Girls	18	41	29	20	108
Unknown	Boys	22	16	64	30	132
	Girls	13	17	36	23	89
Sub-Total	Boys	112	102	220	111	545
	Girls	87	103	173	84	447
	Total	119	205	393	195	992

TABLE A.10

Distribution of Observed HTRP Population in Grade IX (1959-60) Who Did and Did Not Continue to Grade XII (1962-63) By Cultural Background, Sex Role and Community Location.

Cultural Background	Sex Role	School Community Locations				Total
		A	B	C	D	
	Enrolled Grade IX (1959-60)					
Anglo	Boys	154	93	152	88	487
	Girls	148	91	116	67	422
Latin	Boys	4	1	51	26	82
	Girls	0	1	50	20	71
Negro	Boys	8	33	26	5	72
	Girls	16	39	33	7	95
Unknown	Boys	76	17	96	44	233
	Girls	50	15	79	19	162
Sub-Total	Boys	242	144	325	163	874
	Girls	214	146	278	113	751
	Total	456	290	603	276	1625
	Enrolled Grade IX to Grade XII (1962-63)					
Anglo	Boys	101	73	114	54	342
	Girls	111	61	87	44	303
Latin	Boys	1	1	21	10	33
	Girls	0	1	19	10	30
Negro	Boys	0	0	2	1	3
	Girls	1	0	5	3	9
Unknown	Boys	34	12	42	12	100
	Girls	23	10	41	3	77
Sub-Total	Boys	136	86	179	77	478
	Girls	135	72	152	60	419
	Total	271	158	331	137	897
	Dropout or Transfer Between 1959-60 and 1962-63					
Anglo	Boys	53	20	38	34	145
	Girls	37	30	29	23	119
Latin	Boys	3	0	30	16	49
	Girls	0	0	31	10	41
Negro	Boys	8	33	24	4	69
	Girls	15	39	28	4	86
Unknown	Boys	42	5	54	32	133
	Girls	27	5	38	16	86
Sub-Total	Boys	106	58	146	86	396
	Girls	79	74	126	53	332
	Total	185	132	272	139	728

TABLE A.11

Distribution of Observed HTRP Population in Grade IX (1959-60) Who Did and Did Not Continue to Grade XII (1962-63) By Family Status, Sex Role, and Community Location.

Family Status	Sex Role	School Community Locations				Total
		A	B	C	D	
		Enrolled Grade IX (1959-60)				
UC-UM	Boys	29	15	21	5	70
	Girls	26	10	19	7	62
LM	Boys	61	22	41	20	144
	Girls	57	33	38	19	147
UL	Boys	43	40	65	49	197
	Girls	50	41	48	38	177
LL	Boys	16	21	27	23	87
	Girls	10	31	27	11	79
Unknown	Boys	93	46	171	66	376
	Girls	71	31	146	38	286
Sub-Total	Boys	242	144	325	163	874
	Girls	214	146	278	113	751
	Total	456	290	603	276	1625
		Enrolled Grade IX to Grade XII (1962-63)				
UC-UM	Boys	21	11	19	3	54
	Girls	19	9	17	5	50
LM	Boys	42	19	29	15	105
	Girls	51	19	32	17	119
UL	Boys	26	26	44	26	122
	Girls	31	23	31	22	107
LL	Boys	4	9	17	11	41
	Girls	2	6	8	5	21
Unknown	Boys	43	21	70	22	156
	Girls	32	15	64	11	122
Sub-Total	Boys	136	86	179	77	478
	Girls	135	72	152	60	419
	Total	271	158	331	137	897
		Dropout or Transfer Between 1959-60 and 1962-63				
UC-UM	Boys	8	4	2	2	16
	Girls	7	1	2	2	12
LM	Boys	19	3	12	5	39
	Girls	6	14	6	2	28
UL	Boys	17	14	21	23	75
	Girls	19	18	17	16	70
LL	Boys	12	12	10	12	46
	Girls	8	25	19	6	58
Unknown	Boys	50	25	101	44	220
	Girls	39	25	85	27	176
Sub-Total	Boys	106	58	146	86	396
	Girls	79	74	126	53	332
	Total	185	132	272	139	728

TABLE A.12

Distribution of Observed HTRP Population in Grade IX (1959-60) Who Did and Did Not Continue to Grade XII (1962-63) By Mental Function, Sex Role and Community Location.

Mental Function	Sex Role	School Community Locations				
		A	B	C	D	Total
		Enrolled Grade IX (1959-60)				
High	Boys	10	9	41	6	66
	Girls	11	20	33	8	72
Average	Boys	77	67	103	57	304
	Girls	73	72	103	47	295
Low	Boys	20	12	25	15	72
	Girls	23	10	19	16	68
Unknown	Boys	135	56	156	85	432
	Girls	107	44	123	42	316
Sub-Total	Boys	242	144	325	163	874
	Girls	214	146	278	113	751
	Total	456	290	603	276	1625
		Enrolled Grade IX to Grade XII (1962-63)				
High	Boys	8	3	16	2	29
	Girls	11	3	14	3	31
Average	Boys	64	55	81	41	241
	Girls	61	51	72	36	220
Low	Boys	15	9	22	14	60
	Girls	18	7	17	12	54
Unknown	Boys	49	19	60	20	148
	Girls	45	11	49	9	114
Sub-Total	Boys	136	86	179	77	478
	Girls	135	72	152	60	419
	Total	271	158	331	137	897
		Dropout or Transfer Between 1959-60 and 1962-63				
High	Boys	2	6	25	4	37
	Girls	0	17	19	5	41
Average	Boys	13	12	22	16	63
	Girls	12	21	31	11	75
Low	Boys	5	3	3	1	12
	Girls	5	3	2	4	14
Unknown	Boys	86	37	96	65	284
	Girls	62	33	74	33	202
Sub-Total	Boys	106	58	146	86	396
	Girls	79	74	126	53	332
	Total	185	132	272	139	728

TABLE A.13

Distribution of Disadvantaged, Original HTRP Anglo-American Students Who Continued to Grades IX and XII with HTRP Transfers or Dropouts from 1957-58 to 1962-63.

Family Status	Sex Role	School Community Locations				Total
		A	B	C	D	
Disadvantaged HTRP Anglo-American Students						
UL	M	44	45	73	56	218
	F	50	46	44	40	180
LL	M	16	26	17	11	70
	F	4	19	12	5	40
Sums	M	60	71	90	67	288
	F	54	65	56	45	220
	Total	114	136	146	112	508
Continued Enrollment to Grade IX						
UL	M	38	36	53	37	164
	F	44	34	35	27	140
LL	M	15	10	11	10	46
	F	1	13	9	1	24
Sums	M	53	46	64	47	210
	F	45	47	44	28	164
	Total	98	93	108	75	374
Continued Enrollment to Grade XII						
UL	M	26	27	39	22	114
	F	31	23	24	17	95
LL	M	5	9	9	8	31
	F	1	8	1	0	10
Sums	M	31	36	48	30	145
	F	32	31	25	17	105
	Total	63	67	73	47	250
HTRP Transfers or Dropouts (1957-58 to 1962-63)						
UL	M	18	18	34	34	104
	F	19	23	20	23	85
LL	M	11	17	8	3	39
	F	3	11	11	5	30
Sums	M	29	35	42	37	143
	F	22	34	31	28	115
	Total	51	69	73	65	258

TABLE A.14

Distribution of Disadvantaged, Original HTRP Latin-American Students Who Continued to Grades IX and XII with HTRP Transfers or Dropouts from 1957-58 to 1962-63.

Family Status	Sex Role	School Community Locations				Total
		A	B	C	D	
Disadvantaged HTRP Latin-American Students						
UL	M	1	0	21	13	35
	F	0	1	25	11	37
LL	M	1	1	33	12	47
	F	0	0	35	6	41
Sums	M	2	1	54	25	82
	F	0	1	60	17	78
	Total	2	2	114	42	160
Continued Enrollment to Grade IX						
UL	M	1	0	15	12	28
	F	0	0	17	10	27
LL	M	0	1	19	9	29
	F	0	0	20	6	26
Sums	M	1	1	34	21	57
	F	0	0	37	16	53
	Total	1	1	71	37	110
Continued Enrollment to Grade XII						
UL	M	0	0	6	6	12
	F	0	1	8	4	13
LL	M	0	1	10	3	14
	F	0	0	10	4	14
Sums	M	0	1	16	9	26
	F	0	1	18	8	27
	Total	0	2	34	17	53
HTRP Transfers or Dropouts (1957-58 to 1962-63)						
UL	M	1	0	15	7	23
	F	0	0	17	7	24
LL	M	1	0	23	9	33
	F	0	0	25	2	27
Sums	M	2	0	38	16	56
	F	0	0	42	9	51
	Total	2	0	80	25	107

TABLE A.15

Distribution of Disadvantaged, Original HTRP Negro-American Students Who Continued to Grades IX and XII with HTRP Transfers or Dropouts from 1957-58 to 1962-63.

Family Status	Sex Role	School Community Locations A	B	C	D	Total
		Disadvantaged HTRP Negro-American Students				
UL	M	4	12	14	1	31
	F	7	12	8	3	30
LL	M	4	21	12	4	41
	F	9	27	25	4	65
Sums	M	8	33	26	5	72
	F	16	39	33	7	95
	Total	24	72	59	12	167
		Continued Enrollment to Grade IX				
UL	M	4	4	14	1	23
	F	6	7	7	3	23
LL	M	4	9	12	4	29
	F	8	17	19	4	48
Sums	M	8	13	26	5	52
	F	14	24	26	7	71
	Total	22	37	52	12	123
		Continued Enrollment to Grade XII				
UL	M	0	0	0	0	0
	F	0	0	0	2	2
LL	M	0	1	1	1	3
	F	1	0	2	1	4
Sums	M	0	1	1	1	3
	F	1	0	2	3	6
	Total	1	1	3	4	9
		HTRP Transfers or Dropouts (1957-58 to 1962-63)				
UL	M	4	12	14	1	31
	F	7	12	8	1	28
LL	M	4	20	11	3	38
	F	8	27	23	3	61
Sums	M	8	32	25	4	69
	F	15	39	31	4	89
	Total	23	71	56	8	158

underlying cognitive variables measured prior to the deviant behavior. In other words, are delinquency and early school-leaving related in any manner to conditions, attributes, or circumstances which existed prior to their occurrence?

Reluctantly, the decision had to be made to probe only into the two forms of disvalued behavior among males. Of the 956 male subjects identified in Grade VII (1957-58), only 634 had completed the total battery of assessment instruments shown in the VII column of Table A.20. That is, during the seventh-grade year, 322 males responded to one or more of the HTRP instruments while registered at a junior-high school and either dropped out of school during 1957-58 or had not responded to one of the instruments Kelly required among the antecedent measures to test his hypotheses. The HTRP staff had good reason to infer, from frequent participant observation in the four communities and in workshops arranged with school personnel with the cooperation of the Boards of Education, that many children--particularly from minority-group families--leave school as a consequence of changes in teaching behavior and curriculum from the sixth to the seventh grade.

Of the 634 males who had completed the battery of seventh-grade instruments that Kelly had specified, only 528 had enrolled in the junior high schools of the four communities at the end of Grade IX (1959-60). These boys were the population for his dissertation research. Table A.16, which follows the definitions of categories employed therein, shows the classifications of the 528 males studied as of October 1, 1962. Upon that date a majority of the original male students were enrolled in Grade XII, the senior year. All the categorized behavior took place subsequent to 1957-58, the initial year of the HTRP:

> Delinquents.-Specific individuals in the original HTRP population whose behavior was evaluated either by law enforcement officers or by highly respected citizens to be in violation of the state's legal code in so far as it applies to persons designated as minors. Included were recorded behaviors which led to direct juvenile court action, not necessarily incarceration. Of the 55 reported delinquents, 23 did not complete the 1957-58 battery. Thus only 32 are recorded in Table A.16.
>
> Dropouts.-The term was used to designate ninth-grade boys who had left school prior to enrollment in their senior year, completion of which would mean high school graduation. Of the 104 subjects identified as dropouts, only 52 completed the original Grade VII battery. Thus, as with the observed future delinquents, a selective process could have been at work to bias results reported herein.

TABLF A.16

Distribution of Original Seventh-Grade Male Students in Senior High Schools by Category and Community Location.

Category in Early Grade XII	Location A	B	C	D	Total Males
Transfers, X-XII	46	21	14	23	104
Dropouts	14	12	14	12	52
Delinquents	2	7	18	5	32
Continuants	87	69	129	55	340
Total Males	149	109	175	95	528

Transfers.-This classification refers to boys who transferred to schools outside the original community after completion of Grade IX and before the twelfth grade census on October 1, 1962. Those who transferred prior to the end of Grade IX were reported among the 356 male transfers or dropouts tabulated in the first HTRP report (McGuire & Associates, 1960).

Continuants.-This category is for male students originally enrolled in Grade VII (1957-58) who also were enrolled as students in Grade XII on October 1, 1962.

An abstract of Kelly's dissertation, "Deviant Behavior Among Male Adolescents" (1963), appears in Appendix C. Although the present section is in the form of a working paper summarizing demographic data, a reference to Kelly's findings is appropriate at this point to encourage some readers to consult the microfilmed dissertation and published articles. Since Dewey and Freud, impulse control, delay of gratification, and affective neutrality (Parsons & Shils, 1951) have been evoked as critical explanatory concepts to explain variations in social development and in personality dynamics but there has been little empirical evidence to confirm the proposition. Articles by Kelly & Veldman (1964) as well as a discriminant analysis with crossvalidations by Kelly, Veldman, & McGuire (1964) taken together with Kelly's (1963) and Whiteside's (1964) dissertations, however, indicate that STEP Listening has the necessary construct validity (Loevinger, 1957) to be acceptable as a measure of impulse control. The deviant in a school setting, dropout and/or delinquent, frequently manifests a relative inability to attend to what is being said in the classroom. Impulse control, measured by STEP Listening, turns out to be an important element in the evaluation of academic achievement by teachers (Whiteside, 1964) and, among middle-class students, is not necessarily related to intelligent behavior as measured by CTMM Mental Function (Kelly & Veldman, 1964).

Age-Mate Acceptance in Adolescent Societies

The concept of an adolescent society began to be accepted by the educational establishment and by sociologists midway through the years the HTRP was being carried on as a longitudinal study. James S. Coleman (1964) has written an account of the transformation of his research from a focus upon a limited set of questions defined by specific hypotheses about "social climates in high schools" [the title required by his cooperative research agreement and used in Cooperative Research Monograph No. 4 (1961a)] to an emphasis upon the various sources and consequences of status in The adolescent society (1961b), the title of his book. Two of the early readily available articles which reflected Coleman's increasing awareness of a "society of adolescents" and its influences upon academic achievement in the schools he studied appeared in the Harvard Educational Review (1959) and the American Journal of Sociology (1960). In summary, Coleman and his coworkers found that, in adolescent societies, the fundamental competition is for "recognition and respect--the elements of which status is composed--in the eyes of one's fellows and the opposite sex" (1961b, p. 143) with the highest values being attached to athletics for boys and to being a leader in activities for girls (in contrast to being a scholar).

Structure and Function of Adolescent Societies

Back in 1942, however, Talcott Parsons had recognized "the youth culture" in his well-known essay on "Age and Sex in the Social Structure" and, for an issue of Daedalus (Winter, 1962), he reconsidered the place of youth culture in American society equating it to Coleman's "adolescent society." On theoretical grounds, Parsons (1964 reprint) had predicted "a markedly greater acceptance of the evaluation of good school work" (p. 174). This prediction could be tested with HTRP data gathered from age-graded adolescent societies in four communities as summarized in the working paper on "Data for a Comparative Study of Adolescent Value-Attitudes" which forms Section VI of Appendix A. Incidentally, using Coleman's own instrument, the data bear out Parsons' prediction! On the other hand, the Texas studies bear out a subsequent panel analysis of the Coleman data (McDill & Coleman, 1963); that is, by the end of the senior year of high school, age-mate acceptance in the adolescent society contributes more to variation in stated college plans than does family background or parental education (McDill & Coleman, 1965).

In his reflections upon his study of "the adolescent society," Coleman (1964) observes that age-grades "were to some degree separate social systems, and, in retrospect, the analysis would have been greatly aided by treating each grade as a unit" (footnote 13, p. 210). In the chapter, Coleman reveals "I was disoriented by literally not knowing how to carry out the analysis" (p. 200). The Principal Investigator of the HTRP recalls that he had a similar experience, recorded in his doctoral dissertation (McGuire, 1949, pp. 2-19, 363-419), when he attempted to "make sense" of the longitudinal data on boys and girls of three age-groups in a community known as "Elmtown" (Hollingshead, 1949), "Prairie City" (Havighurst & Taba, 1949; Peck & Havighurst, 1960), "Jonesville" (Warner & Associates, 1949), and "Hometown" (Warner, Havighurst, & Loeb, 1944).

127

Among the keys to the analysis of longitudinal data from Elmtown (Midwest), one of the places studied by Coleman more than a decade later, was theory developed in chapters on "re-formation of the ego in adolescence" (pp. 199-279) in Sherif & Cantril's recently reprinted (1966) The psychology of ego-involvements (1947), particularly a section upon "effects of age-mate reference groups" (pp. 251-274). Both interview and sociometric data converge to demonstrate the continuing nature of an age-mate society as illustrated in the sociograms for the "M" age-grade taken from McGuire's original report in Figures A.02 (at age 14 years) and A.03 (at age 18 years or high school graduation). Similar evidence of adolescent societies, with cliques therein, were found in comparative studies of the "S" age-groups, studied but not recognized as an age-mate society by either Hollingshead or by Havighurst & Taba, and of the "T" age-group which provided subjects for the Peck & Havighurst book wherein the influences of peer association upon moral character are taken into account (1960, pp. 126-141).

Multivariate analyses of data lead one to infer that, within any given age-mate society of adolescents, a web of social relationships persists through time despite the entrance and exit of members (McGuire, 1949, p. 200). Although Hollingshead (1949) concluded that the social behavior of adolescents is related functionally to the positions their families occupy in the social structure of the community, a study of social mobility (McGuire, 1949, pp. 216-259) using longitudinal data on many of the same subjects would seem to contradict what he presents in Elmtown's Youth. The highest association between peer status and family status is represented by a contingency coefficient, C = .49 (that is, 25 per cent common variance) despite the fact that this first IPS was a class-weighted index!

When changes in age-mate acceptance were studied in relation to family background, making use of the wealth of other data available, two examples of the dynamic influences of the age-mate societies clearly stood out (p. 377). First, a majority of the "climbers" learn from high peer status "static" youth with whom they affiliate, and who serve as models for imitative identification, particularly when there is relatively little emotional dependence upon parents or other members of the family of orientation. Second, a "decliner" very often is a girl or boy either on the periphery of, or rejected by, his or her age-mate adolescent society. Some may be emotionally involved with their families and "little understood" by their teachers. In Figures A.02 and A.03, which depict the "M" age-mate society at ages 14 and 18 respectively, the legends do not explain that family status is indicated by A (Upper Class), B (Upper-Middle), C (Lower-Middle), D (Upper-Lower), and E (Lower-Lower). Compari-

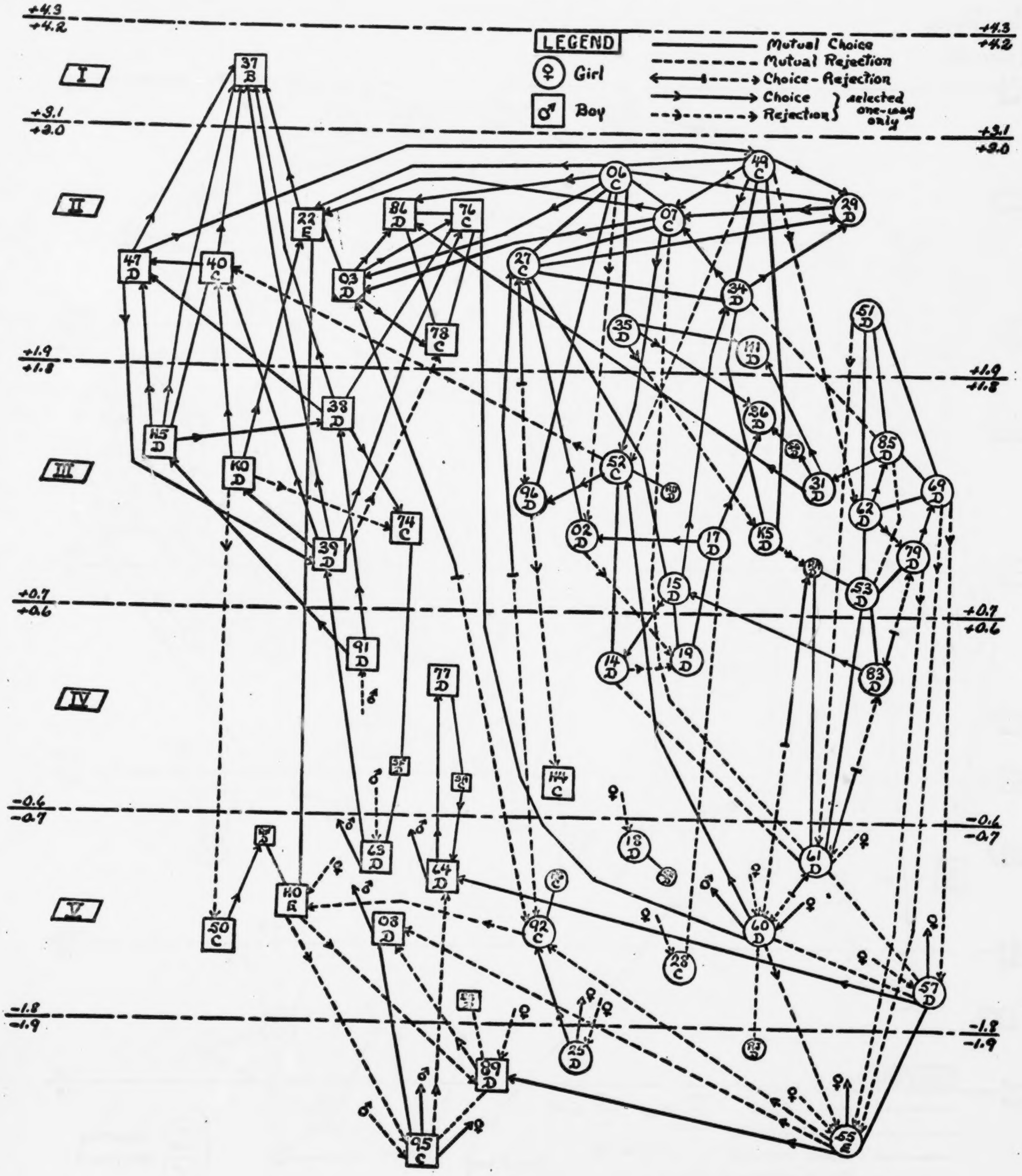

LEGEND
Girl
Boy
Mutual Choice
Mutual Rejection
Choice-Rejection
Choice
Rejection
selected one-way only
+4.3
+4.2
+3.1
+3.0
+1.9
+1.8
+0.7
+0.6
-0.6
-0.7
-1.8
-1.9
I
II
III
IV
V
37 B
22 E
86 D
76 C
06 C
49 C
07 C
29 D
47 D
40 C
03 D
27 C
34 D
78 C
35 D
51 D
41 D
38 D
36 D
45 D
40 D
52 C
85 D
31 D
96 D
69 D
74 C
62 D
02 D
17 D
45 D
39 D
79 D
15 D
53 D
91 D
14 D
19 D
83 D
77 D
44 C
18 D
63 D
61 D
64 D
40 E
50 C
03 D
92 C
60 D
28 C
57 D
25 D
89 D
95 C
65 E

Figure A.02 Sociogram of the "M" Age-grade of Elmtown at age 14 years

129

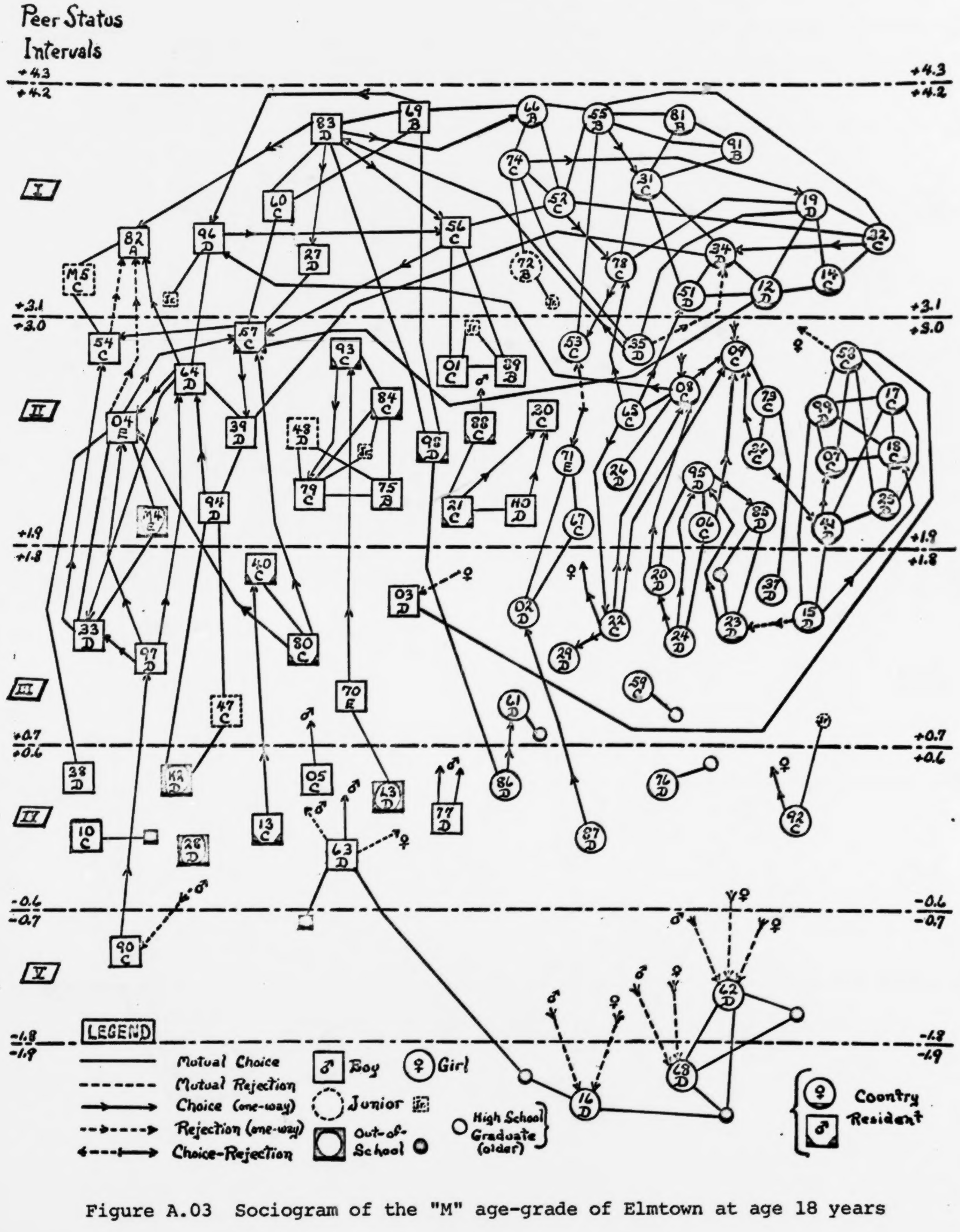

Peer Status Intervals
+4.3
+4.2
I
+3.1
+3.0
II
+1.9
+1.8
III
+0.7
+0.6
IV
-0.6
-0.7
V
-1.8
-1.9
LEGEND
Mutual Choice
Mutual Rejection
Choice (one-way)
Rejection (one-way)
Choice-Rejection
♂ Boy
♀ Girl
Junior
Jr.
Out-of-School
High School Graduate (older)
♀ ♂ Country Resident

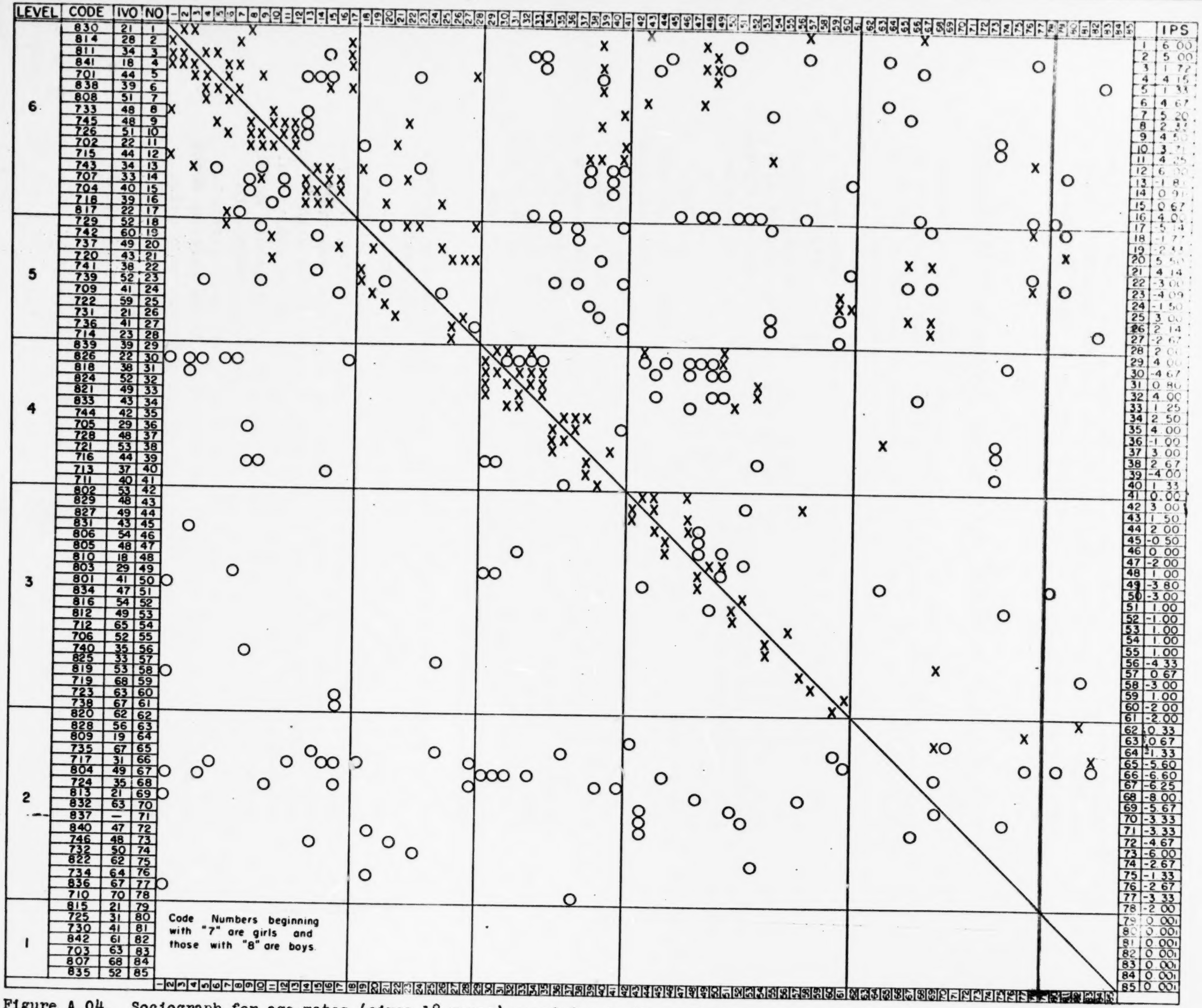
Figure A.03 Sociogram of the "M" age-grade of Elmtown at age 18 years

sons may be made with Coleman's (1960) networks of reciprocal relationships for Elmtown boys (p. 176) and girls (p. 180) which encompass all four age-grades and do not reflect negative evaluations of one another. Both systems involve a great deal of judgment.

Sociographic Representation of Age-Mate Acceptance in Adolescence

Beginning with the academic year 1949-50, McGuire had moved from the Committee on Human Development at Chicago to help build an interdisciplinary base of dyadic developmental-social psychology as a generic framework for Educational Psychology at The University of Texas. Then a number of graduate students and several faculty members began to study facets of interpersonal relatedness among age-mates--cognitive development, self and personality dynamics, the educational encounter, and socio-cultural behavior--not only in adolescent societies associated with secondary schools but also in elementary-school and college years. Rodney A. Clark devised objective rules for constructing sociographs as well as a sociographic Index of Peer Status (IPS) to replace McGuire's original class-weighted index. Their common concern about representing objectively the phenomena of age-mate acceptance arose out of repeated observations that being accepted by, being peripheral to, or being rejected by one's age-mates has a psychological impact upon children and adolescents observable in many facets of their behavior. After evaluating the Clark & McGuire articles in Child Development (1952, pp. 129-140, 141-154), Maxwell observed in the Annual Review of Psychology (1954), "Still, until something like these indices can be used, it is unlikely that anything of permanent value will emerge from the current sociometric studies" (p. 365).

An example of the Clark-McGuire sociographic matrix to represent the clique structure and cleavages in an age-mate society appears in Figure A.04 constructed from sociometric valuations elicited in response to a pair of stimulus items; namely, (i) "Name three persons you would prefer to run around with most of the time" and (ii) "Name three persons you might not prefer to be with most of the time; they could be with other people." Another item-pair was used to elicit additional positive and negative nominations (no duplications used); namely, (iii) "Name three persons about your age you would prefer to have along if you were going to a game or party this weekend. They are the ones to be with" and (iv) "Name three persons about your age you might not prefer to have along if you were going to a game or party. They could go other places. They have their own friends." The stimulus items for constructing a sociograph are interspersed with other nomination items eliciting peer valuations for variables with MFNs 010 to 048 described



Code Numbers beginning with "7" are girls and those with "8" are boys.

Figure A.04. Sociograph for age-mates (circa 18 years) remaining in the graduating class at Textown Senior High School (illus- t[illegible]ve c[illegible]RP t[illegible]th-[illegible] so[illegible]raph[illegible]th N[illegible]oo [illegible] to [illegible]rese

on pages A-65 to A-68 in section III of this Appendix A. Subjects are entered in a sociographic sequence as described on pages 3-31 to 3-34 in Chapter III of the final report for Cooperative Research Project No. 742 (McGuire & Associates, 1968). Positive (x) and negative (o) nominations from individuals numbered horizontally are directed to those in the vertical sequence.

Notice that a natural cleavage occurs between the girl numbered "28," where positive nominations first cease, and that the boys "29" with the next highest sociographic score continues the sociographic sequence. Other natural cleavages may be observed between 41/42, 61/62 (the avoided ones), and 78/79 (the isolates). Sociographic levels 1 to 6, shown at the left of the sociograph, determine the relative weights to be assigned to each informant's valuations in computing values for an index of peer status (IPS) entered to the right of the matrix after numbers indicating the order of each girl and boy in the sociographic sequence (McGuire & Clark, 1952; McGuire & Associates, 1968, pp. 3-32 to 3-35). Values for an Index of Value Orientation (IVO) reflect family backgrounds (McGuire, 1952) and are based upon ratings of the education, religious affiliation, occupation, and source of income for the status parent. For example, the boy 830 with IPS = +6.00, who began the sociographic sequence (because he had the highest "sociographic score" or SS = 6 PV + 3 MV = 9) named 814, 811, and 841 "to run around with," added girls 733 and 715 "to party with." Mutual valuations (MV) are with two boys 814 and 811 from UM backgrounds as well as a girl 715 from a LM family who, in turn, is one of the links between the male and adjoining female cliques in the "top crowd." Relationships to persons outside the age-grade cannot be represented as in the sociogram for 18-year-olds in Figure A.03.

Sociometric Variables in the Study of Adolescent Behavior

Perhaps the most readable summary of research among adolescents is the fourth in a series of Groves Lectures at the University of North Carolina, "Family and Age-Mates in Personality Formation" (McGuire, 1953). A paper prepared for the Texas Academy of Science, "The Textown Study of Adolescence" (McGuire, 1956), summarizes that undertaking which led into the HTRP and, from 1959-60 onward, the replication of the Coleman Research. Responses to Coleman's major instrument are summarized in section VI, pages A-130 to A-147, of this Appendix A.

Findings to be incorporated in an article now in preparation might be of interest. An intraclass correlation coefficient of $r_I = .68$ between peer status obtained for a sample of 180 indi-

133

viduals from one year to the next indicates approximately 50 per cent common variance in IPS values when the influences of family life style (IVO), three different age-mate societies, sex-role differences, and their interactions were removed by means of an analysis of variance design. Since the subsamples of 30 Ss were drawn according to requirements for randomization to represent different age-mate societies and family backgrounds as well as both sex roles and sociographic representations a year apart in time, the intraclass coefficient is an acceptable estimate of reliability for peer status indices or IPS values employed to depict relative acceptance among age-mates (Hays, 1963, p. 424; Winer, 1962, pp. 124-132). Role assignments in terms of nominations as Wheel, Average One, Mouse, Wild One, and Drip in three different age-mate societies tend to vary as one would predict according to three categories of peer status (acceptance, ambivalence, and avoidance). When girls are evaluated as Brains and when boys are regarded as Wild Ones, however, they usually have IPS values which reflect avoidance by their peers. The foregoing findings lend strong support to a proposition formulated by Coleman (1964, p. 203) when he later prepared a research chronicle upon The Adolescent Society (1960); namely, that the interposition of age-graded educational institutions where young people have an opportunity to come together gives rise to separate subcultures based on age which interrupt generational continuity, yet have some characteristics in common.

Other findings based upon data from the Textown and HTRP studies of adolescent behavior lend credence to Coleman's focus upon "analysis of roles" and the transformation from concern about "a narrow framework of hypotheses that I had specified" to posing very broad "questions about the sources and consequences of adolescent status systems" (1964, pp. 201-203). Positive and negative nominations of one another as role models (Personal, Behavioral, Academic) in our research vary as one would predict according to peer status with no significant variation across three age-grades. Accepted age-mates, regardless of sex, are evaluated as active in behavioral approach, whereas girls in general tend to be assessed more often than boys as passive. In terms of behavioral controls, impulsivity is attributed to the avoided age-mates and impulse control is related to acceptance, with a tendency to nominate girls more frequently than boys in each peer status category. Again there is no significant variation across age-grades.

In addition to the nominations representing role assignments usually found in adolescent societies (Wheel, Brain, Average One, Mouse, Wild One, Drip), positive and negative role models (Personal, Behavioral, Academic), behavioral approach (Active vs. Passive), behavioral control (Impulsive vs. Impulse Control), for which the analyses confirmed theoretical predictions, age-mate valuation of one another were elicited by items representing relational orientations (adult-oriented, peer oriented, self-oriented or individualistic). The theory underlying relational orientations had two sources. One was the tradition-oriented, other-directed and inner-directed types described by Riesman, Glazer, & Denney (1953). The other is a definition of man's relation to other men in terms of lineal, collateral, and individualistic principles by Florence Kluckhohn (1950). The younger age-mate societies, responding during their tenth- and eleventh-grade years, respectively, named more persons "who always depend upon kids about their own age for advice" than did those who responded in their twelfth-grade year. Nominated as persons "who are sort of independent in making up their own mind" were young people regarded with acceptance, avoidance, and with ambivalence in that order. Girls were evaluated as being more autonomous than boys in each age-grade. Regardless of peer status, however, girls more often than boys were named as persons "who always depend on their parents or older people for advice. They look up to older persons for approval." Not only is there evidence for the construct validity of the sociometric variables but also the estimate of reliability, r_I = .68 when all sources of inflation have been removed, indicates some degree of stability in peer acceptance as measured by IPS values from one year to another in three different age-mate societies.

During a critical period in the analysis of the senior-high sociometric data, the HTRP staff lacked guidance to work out and test computer programs to construct sociographs and compute IPS values--theoretically a feasible means of reducing the man-hours required to represent sociometric valuations for a relatively larege population. Consequently, they adopted procedures employed by Hindsman (1960; dissertation abstract in Appendix C) when the Principal Investigator was incapacitated by a CVA during 1962-63. Even the use of frequency data, unweighted by sociographic level, confirms the value of age-mate assessments in the explanation of "Dimensions of Teacher Evaluation of Academic Achievement" (Whiteside, 1964; dissertation abstract and tables in Appendix C).

School Dropouts and the Age-Mate Society

Being accepted, avoided, rejected, or isolated by persons about one's own age apparently has more to do with the successful continuation of an education in secondary schools and colleges than parents, teachers, professors, educational administrators, and most behavioral scientists care to admit. In terms of dyadic interaction theory, reciprocal stimulation with cultural agents of one's own generation may be equally or more important than with close-tied authority figures (parents) or more remote ones representing institutions (teachers, professors) in the development of effectively functioning human beings (McGuire, 1962, pp. 415-416) who have central processes underlying intelligent behavior adaptive to changing circumstances (Rowland & McGuire, 1968a). When one examines sociographs of the same adolescent society from the ninth- to the twelfth-grade years, a large proportion of those who have scholastic difficulties and of those who drop out of school are isolated at sociographic level 1 in Figure A.04. The "rejected ones" at level 2 at least are "noticed" by their age-mates.

Simulation of Grouping for Instruction

In the spring of 1957, P. E. Vernon (an eminent British student of human abilities) gave an address on "Education and the Psychology of Individual Differences" at Yale University which later (1958) was published in the Harvard Educational Review. He stated the problem succinctly, "One of the most urgent and most controversial questions in education today is what kind of organization will encourage the fullest development of the varied mental capacities and inclinations of students." Further, he proposed that, "Any grouping should be based on some characteristic which: first, is stable and enduring; second, can be accurately assessed; third, has a major influence on educational progress; and fourth, is acceptable to society." Using data from Cooperative Research Project No. 098, Getzels & Jackson examined the meaning of "giftedness" analytically (1959b) and expanded the single-metric IQ conception of intellectual functioning to identify "highly intelligent" and "highly creative" adolescents (1959a) whom they studied in terms of familial influences (1961), school achievement, teacher preferences, motivational and attitudinal differences (1960, 1962, 1964). The HTRP team was aware not only that students's grades (GPA) are the traditional criterion of academic achievement but also from research (Brown, Holtzman, & McGuire, 1955) that high school quartile rank (HSQR) and high school percentile rank (HSPR) were related substantially to measures of academic achievement in early years of college. Consequently, the simulation of grouping for instruction in the HTRP was in terms of convergent thinking (highly intelligent), divergent thinking (highly productive), and teacher evaluation of academic achievement (GPA) as described in Section III.

Coping with Educational Issues Raised by Human Variability

The assumption that homogeneous grouping facilitates the educational encounter for both pupil and teacher has had such an intuitive appeal not only to persons in teacher education programs but also to school people that the research group had to consider schemes of grouping for instruction at the four HTRP locations.

The various schemes, such as "ability grouping," fitting pupils to teachers, "managed grouping," and even some forms of individualization of instruction, all were examined at workshops organized during the summer not only on the campus of The University of Texas at Austin but also in locations where people from Ashton and Bandana as well as Centerville and Duneside could meet together prior to the opening of school. The respective boards of education participated to the extent of providing per diem expenses for the teachers, supervisors, and administrators who attended work conferences under the direction of HTRP personnel. Some account of our inquiry into "grouping for instruction" and the "individualization of instruction" are quite appropriate at this point. They should be read with Foshay's comment in a foreward to a recent report by Goldberg, Passow, & Justman (1966) wherein he suggests that ability grouping functions not as "individualization of instruction" but as "selective deprivation."

Beliefs about grouping for instruction.-Whenever there are more pupils in a school than there are teachers, some means has to be found to group them for instructional purposes. This is a principle most teachers, pupils, and parents take for granted. Nevertheless, an elementary education was achieved by children in America for almost two centuries before they came to be taught in "classes." In general, "classes" were organized upon a basis which social anthropologists would term age-graded expectations and pupils either were "passed" or "failed" at the close of a school year. According to Cubberley (1934, pp. 311-312), the "new Quincy Grammar School" of 1848 in Boston was the first unified and graded grammar school. The "reading" and "writing" schools were replaced with self-contained classrooms which seated 55 pupils in charge of one teacher. After the Civil War, increasing urbanization fostered the practice of classifying pupils into grades. To cope with the rigidity which began to appear in the structure of education, however, plans for the individualization of instruction also appeared. The point is that any plan of grouping for instruction which can be proposed as a panacea, either within a school or by a class therein, already has been attempted sometime, somewhere, by someone, often paralleled by newspaper publicity and an article in a reputable publication wherein beliefs become rationales--usually without an adequate test of what has been proposed.

Myths about "ability grouping" persist and provide convenient fictions for grouping pupils according to their intellectual talents, particularly in so-called "homogenous groups." By and large, decisions about who are to be placed together for instruction have been based upon the psychological measurement of abilities and aptitudes. Past practices of "grouping pupils for maximum achievement" have been analyzed perceptively by Henry

Otto (1959) who appraised the educational climate of the mid-century decade and observed "we operate as if we denied the existence of, or wished to eradicate, individual differences." Then he strikes at the heart of grouping for instruction, "If we accept the principle of individual differences, we must also accept the principle of differentiated education."

Individualization of instruction.-The most recent proposals for coping with the educational issues raised by human variability focus upon "individualizing instruction," the title of Part I of the 61st NSSE Yearbook prepared by a committee with Fred T. Tyler as chairman (1962). One consequence has been the appearance of nongrading (or "continuous progress") plans of school organization at both elementary (Goodlad & Anderson, 1963) and secondary school levels (Brown, 1963; Morse, 1960). Another outcome has been the acceptance of plans involving flexible scheduling and team teaching (Shaplin & Olds, 1964) which require "learning space" for large-group, small-group, and individual educational reforms; however, Woodring (pp. 286-305 in Hilgard, 1964) suggests that the appropriate term for "team teaching" should be "team organization and planning" since instruction usually is the responsibility of an individual rather than a team (p. 292). Although Woodring was not in a position to evaluate current developments in computer assisted instruction (Suppes, 1966), he did evaluate the Conant proposals (1959) for ability grouping "subject by subject" in comprehensive high schools as well as his program for the talented (defined as "the top 15 per cent on tests of academic aptitude"). Even though he is critical of the Conant proposals (pp. 296-298), Woodring is well aware that the underlying assumptions reflect a pragmatic theory of learning accepted by a majority of classroom teachers.

Recent developments.-The search continues for some sort of panacea for the problems faced in schools and colleges when they are attended by children and youth representing an array of individual differences. Chapters in the Review of Educational Research have considered instructional strategies that facilitate the use of educational media in the attainment of educational objectives (Edling, 1968), computer assistance with the educational process (Hansen, 1966), and strategies for computer-based learning situations (Zinn, 1967). The "fit" between instructor and student in terms of complementary qualities is the subject matter of a grouping-for-teachability study reported by Thelen (1967). Incidently, attempts at Bandana to employ what Thelen terms "teachability" or "facilitative" grouping (p. 190) in the HTRP underlined the importance of teacher motivation and a professional approach to the educational encounter. Goldberg, Passow, & Justman (1966), after studying ability grouping in elementary schools, concluded that ability grouping does not produce important positive changes in the academic achievement

138

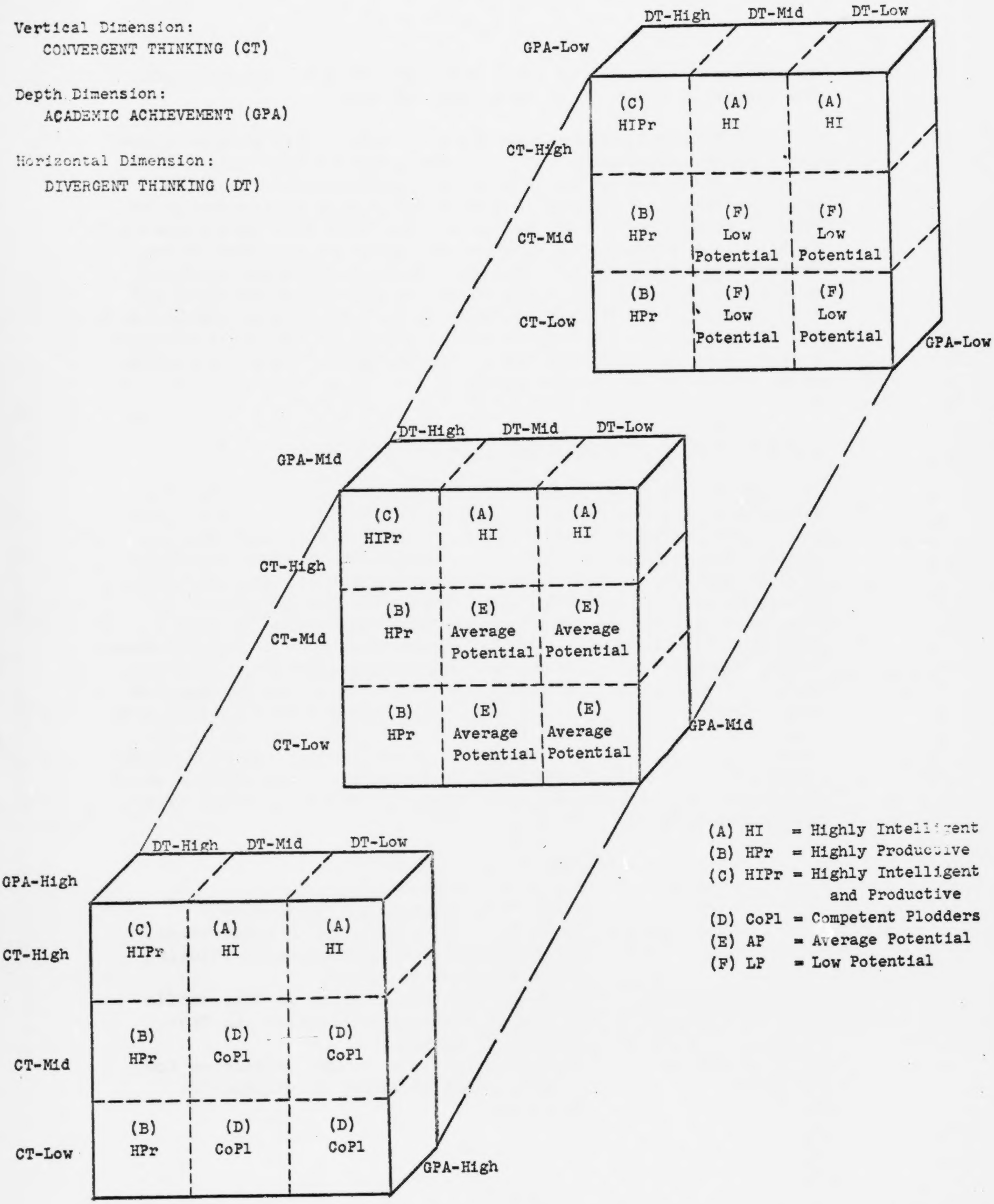
of pupils at any ability level and that its value depends upon the manner in which it is used (pp. 167-168).

In a Cooperative Research Project, Borg (1964) made an elaborate study of grouping pupils in two adjacent Utah school districts. One district was introducing homogeneous or ability grouping whereas the other was continuing with heterogeneous or random grouping with some enrichment for "the more able students." No advantage for ability grouping was found in a number of comparisons involving junior high and senior high school students of the two districts. At the secondary school levels, Borg and his associates found that students in ability groups, particularly low ability pupils, showed a greater amount of emotional disturbance--a finding not supported in the Goldberg, Passow, & Justman study of elementary school pupils.

A Study of HTRP Student Types, Grades VII - XII

Figure A.05 shows dimensions of cognitive behavior for the assignment of students to groups in the simulated study of student types. A cube has been used and three cross-sections are shown. The vertical dimension is convergent thinking (ability to give appropriate responses on tests of intelligence and other objective measures of cognitive behavior). The horizontal dimension is productive thinking (the ability to come up with a number of divergent responses on instruments such as Consequences, Unusual Uses, Common Situations, and Seeing Problems, pp. A-69). The depth dimension represents grade point average (as computed on pp. A-57 which follows). Each dimension has been divided into high, middle, and low, and the cross-sections are shown in the figure. Accordingly, six different student types could be designated in grades VII, IX, and XII by employing three categories of Convergent Thinking, Productive Thinking, and Grade Point Average (GPA); namely,

(A) HI = Highly Intelligent
(B) HPr = Highly Productive
(C) HIPr = Highly Intelligent and Productive
(D) CoPl = Competent Plodders (high in achievement, but middle or low in Convergent Thinking and Productive Thinking)
(E) AvPo = Average Potential (middle in GPA, middle or low in Convergent Thinking and Productive Thinking)
(F) LoPo = Low Potential (low in GPA, middle or low in Convergent Thinking and Productive Thinking)



Vertical Dimension:
CONVERGENT THINKING (CT)

Depth Dimension:
ACADEMIC ACHIEVEMENT (GPA)

Horizontal Dimension:
DIVERGENT THINKING (DT)

GPA-Low

	DT-High	DT-Mid	DT-Low
CT-High	(C) HIPr	(A) HI	(A) HI
CT-Mid	(B) HPr	(F) Low Potential	(F) Low Potential
CT-Low	(B) HPr	(F) Low Potential	(F) Low Potential

GPA-Mid

	DT-High	DT-Mid	DT-Low
CT-High	(C) HIPr	(A) HI	(A) HI
CT-Mid	(B) HPr	(E) Average Potential	(E) Average Potential
CT-Low	(B) HPr	(E) Average Potential	(E) Average Potential

GPA-High

	DT-High	DT-Mid	DT-Low
CT-High	(C) HIPr	(A) HI	(A) HI
CT-Mid	(B) HPr	(D) CoPl	(D) CoPl
CT-Low	(B) HPr	(D) CoPl	(D) CoPl

(A) HI = Highly Intelligent
(B) HPr = Highly Productive
(C) HIPr = Highly Intelligent and Productive
(D) CoPl = Competent Plodders
(E) AP = Average Potential
(F) LP = Low Potential

Figure A.05. Dimensions of cognitive behavior for the selection of student types.

Since the categories were mutually exclusive, 546 HTRP students could be assigned to the six categories in Grades VII and IX, as shown in Table A.18. For example, 181 students who were classified HI in the seventh grade redistributed themselves as 105 HI, 10 HPr, 9 HIPr, 27 CoPl, 21 AvPo, and 9 LoPo. The 103 HPr seventh grade children redistributed themselves as 8 HI, 47 HPr, 13 HIPr, 10 CoPl, 16 AvPo, and 9 LoPo in the ninth grade. Similarly, the 80 HIPr, 51 CoPl, 86 AvPo, and 45 LoPo redistributed themselves in every one of the ninth grade classifications. Table A.17 clearly shows that a significantly large number ($p < .01$) remained in the original category in both the HI and HPr categories. Even though the largest number remained in the original category in the classification of HIPr, CoPl, AvPo, and LoPo seventh grade students when they reached ninth grade, only one other diagonal cell (that for AvPo) attained a chi square probability of .01. Although the contingency coefficient for the whole table ($C = .511$) shows the relationship between seventh and ninth grade enumerations, the classifications for Grade VII clearly do not remain the same in Grade IX. Any grouping in terms of intelligence, productivity, and achievement breaks down during the junior high school years for the 546 boys and girls involved.

Table A.18 for the 502 students who began Grade VII and continued to Grade XII and Table A.19 for the 609 students who were in Grade IX and continued to Grade XII show the same phenomena. The contingency coefficients, .483 and .554 respectively, are significant. Nevertheless, with one exception the students redistribute themselves into each of the six categories over a period of time. The exception is that no LoPo subjects in Grade IX becomes a HIPr student in Grade XII. Students in secondary schools simply do not remain in the same categories over periods of three to six years. Consequently, any attempt to group people for instruction using relatively objective measures and categorizing them at the beginning of a period in junior or senior high school would seem to be inappropriate, even if meaningful categories were used in the beginning. The enumeration data in the three tables run counter to the assumption that homogenous grouping is possible over a period of years. Thus, this Simulation of grouping for instruction tested in Tables A.17, A.18, and A.19 would seem to argue against the use of "curriculum tracks" in secondary schools.

Table A.20 is designed to demonstrate the construct validity of the six student types by demonstrating differences among them in terms of the performance in Grade XII on selected scales. For eight measures in Grade XII students categorized in the six types vary significantly on six of them. They did not differ in Psathas' scale for Independence from Parents (135, p. A-75) and Getzel's Cyclothymia vs. Schizothymia (142, p. A-76). As one would expect, the competent plodders had the highest GPA, and

141

TABLE A.17

Classification of Students from Grades VII to IX in the Continuing HTRP Population

Grade VII Classifications		Grade IX Classifications A	B	C	D	E	F	Totals df ΣX^2 p
A. High IQ (HI)	o	105	10	9	27	21	9	181
	e	62.32	27.85	16.24	26.85	33.15	14.59	
	o-e	42.68	-17.85	-7.24	.15	-12.30	-5.59	
	X^2	29.23	11.44	3.23	.0008	4.56	2.14	50.60
	p	.01	.01			.05		
B. High Prod (HPr)	o	8	47	13	10	16	9	103
	e	35.47	15.85	9.24	15.28	18.86	8.30	
	o-e	-27.47	31.15	3.76	-5.28	-2.86	.70	
	X^2	21.27	61.22	.15	1.82	.43	.01	84.90
	p	.01	.01					
C. High IP (HIPr)	o	39	5	21	5	9	1	80
	e	27.55	12.31	7.18	11.87	14.65	6.45	
	o-e	11.45	-7.31	13.82	-6.87	-5.65	-5.45	
	X^2	4.76	4.34	2.66	3.98	2.18	.46	18.38
	p	.05	.05		.05			
D. Comp Plod (CoPl)	o	16	5	1	18	10	1	51
	e	17.56	7.86	4.58	7.57	9.34	4.11	
	o-e	1.56	-2.85	-3.58	11.57	.66	-3.11	
	X^2	.14	.10	.28	3.37	.00	7.55	11.55
	p						.01	
E. Avg. Potential (AvPo)	o	14	13	4	18	26	11	86
	e	29.61	13.23	7.72	12.76	15.75	6.93	
	o-e	-15.61	-.23	-3.72	5.24	10.25	4.07	
	X^2	8.23	.00	.18	2.15	6.67	.24	17.47
	p					.01		
F. Low Potential (LoPo)	o	6	4	1	3	18	13	45
	e	15.49	6.92	4.04	6.68	8.24	3.63	
	o-e	9.49	-2.92	-3.04	-3.68	9.76	9.37	
	X^2	5.81	.12	.23	.20	1.16	2.42	9.94
	p	.02						
Sums	Totals	188	84	49	81	100	44	546
	ΣX^2	69.44	77.33	6.73	11.52	15.00	12.82	192.84
	df	5	5	5	5	5	5	25
	p	.001	.001		.05	.01	.05	.001

Contingency [illegible]efficient [illegible] $= \sqrt{\frac{X^2}{[illegible] + N}}$ $\sqrt{\frac{192.84}{1[illegible]4 + [illegible]}}$ = [illegible]100 [illegible] .51[illegible]

TABLE A.18

Classification of Students from Grades VII to XII in the Continuing HTRP Population

Grade VII Classifications		Grade XII Classifications A	B	C	D	E	F	Totals	df	ΣX^2	p
A. High IQ (HI)	o	36	36	62	15	12	10	171			
	e	27.93	38.49	33.52	13.28	31.34	26.23		5		
	o-e	8.07	-2.49	28.48	1.72	-19.34	-16.23				
	X^2	2.33	.16	24.20	.22	11.93	10.04			48.88	
	p			.01		.01	.01				.01
B. High Prod (HIPr)	o	7	16	6	9	27	29	94			
	e	15.35	21.16	18.54	7.30	17.23	14.42				
	o-e	-8.35	-5.16	-12.54	1.70	9.77	14.58				
	X^2	4.54	1.26	8.48	.04	5.54	14.74			34.60	
	p	.05		.01		.05	.01				.01
C. High IP (HIPr)	o	30	7	21	3	10	5	76			
	e	12.41	17.11	14.99	5.90	13.93	11.66				
	o-e	17.59	-10.11	6.01	-2.90	-3.93	-6.66				
	X^2	24.93	5.97	2.41	.14	1.11	3.80			38.36	
	p	.01	.05								.01
D. Comp Plod (CoPl)	o	7	12	2	7	11	7	46			
	e	7.51	10.35	9.07	3.57	8.43	7.06				
	o-e	-.51	1.65	-7.07	3.43	2.57	-.06				
	X^2	.00	.26	.55	.33	.08	.00			1.22	
E. Avg Potential (AvPo)	o	2	26	6	4	22	13	73			
	e	11.92	16.43	14.40	5.67	13.38	11.20				
	o-e	-9.92	9.57	-8.40	-1.67	8.62	1.80				
	X^2	8.26	5.57	4.90	.05	5.55	.29			24.62	
	p	.01	.05	.05		.05					.01
F. Low Potential (LoPo)	o	0	16	2	1	10	13	42			
	e	6.86	9.45	8.28	3.26	7.70	6.44				
	o-e	-6.86	6.55	-6.28	-2.26	2.30	6.56				
	X^2	.69	.45	.48	.16	.07	.67			2.52	
Sums	Totals	82	113	99	39	92	77	502			
	ΣX^2	40.75	13.67	41.02	.94	24.28	29.54			150.20	
	df	5	5	5	5	5	5		25		
	p	.01	.05	.01		.01	.01				.01

Contingency Coefficient

$$C = \sqrt{\frac{X^2}{X^2 + N}} = \sqrt{\frac{150.20}{150.20 + 502}} = \sqrt{2.3336} = .483$$

TABLE A.19

Classification of Students from Grades IX to XII in the Continuing HTRP Populations

Grade IX Classifications		Grade XII Classifications A	 B	 C	 D	 E	 F	Totals df ΣX^2 p
A. High IQ (HI)	o	57	22	89	21	21	4	214
	e	36.19	47.44	41.46	19.21	36.55	33.03	5
	o-e	20.81	-25.44	47.54	1.79	-15.55	-29.03	
	X^2	11.97	13.64	54.51	.23	6.62	25.51	112.48
	p	.01	.01	.01		.05	.01	.01
B. High Prod (HPr)	o	7	10	4	10	15	41	87
	e	14.44	19.29	16.86	7.86	26.29	13.43	
	o-e	-7.44	-9.29	-12.86	2.14	-11.29	27.57	
	X^2	3.83	4.47	9.81	.06	4.85	56.60	79.62
	p		.05	.01		.05	.01	.01
C. High IP (HIPr)	o	18	8	8	2	11	6	53
	e	8.96	11.75	10.27	4.79	9.05	8.18	
	o-e	9.04	-3.75	-2.27	-2.79	1.95	-2.18	
	X^2	.91	1.20	.50	.16	.04	.06	2.87
D. Comp Plod (CoPl)	o	14	38	13	14	14	1	94
	e	15.90	8.42	18.21	8.49	16.05	14.51	
	o-e	1.90	29.58	-5.21	5.51	-2.05	-13.51	
	X^2	.23	10.39	1.49	.36	.26	12.58	25.31
	p		.01				.01	.01
E. Avg Potential (AvPo)	o	6	40	4	7	30	24	111
	e	18.77	24.61	21.51	10.02	18.96	17.13	
	o-e	-12.77	15.39	-17.51	-3.02	11.04	6.87	
	X^2	8.69	9.62	14.25	.91	6.43	2.76	42.66
	p	.01	.01	.01		105		.01
F. Low Potential (LoPo)	o	1	17	0	1	13	18	50
	e	8.46	11.08	9.69	4.52	8.54	7.72	
	o-e	-7.46	5.92	-9.69	-3.52	4.46	10.28	
	X^2	.66	3.16	.97	.47	.23	1.37	6.86
Sums	Totals	103	135	118	55	104	94	609
	ΣX^2	26.29	42.48	81.53	2.19	18.43	98.88	269.80
	df	5	5	5	5	5	5	25
	p	.01	.01	.01		.01	.01	.01

Contingency Coefficient $\sqrt{\frac{269.80}{269.80 + 609}} = \sqrt{3,0701} = .554$

TABLE A.20

DIFFERENCES AMONG SIX STUDENT TYPES ON SELECTED SCALES

Variable Name Instruments Administered in Grade XII	STUDENT TYPE MEANS AND STANDARD DEVIATIONS (Standard Deviations in parenthesis)						Grand Mean	F
	Highly Intelligent (HI)	Highly Productive (HPr)	Highly Intelligent and Highly Productive (HIPr)	Competent Plodder (CoPl)	Average Student (AvPo)	Low Potentialities (LoPo)		
Grade XII GPA	N = 135 82.82 (8.41)	N = 153 76.20 (8.96)	N = 134 83.76 (7.96)	N = 68 86.13 (3.00)	N = 33 76.94 (2.66)	N = 61 64.77 (6.69)	79.47	75.76**
CYS Stability vs. Emotionality	N = 134 41.87 (±2.45)	N = 165 41.05 (2.92)	N = 133 41.56 (2.79)	N = 66 40.35 (2.81)	N = 33 41.76 (3.07)	N = 61 40.10 (2.98)	41.21	5.44**
Competitive Pre-Occupation Scale	N = 125 3.26 (±1.46)	N = 151 3.05 (1.45)	N = 126 3.61 (1.43)	N = 64 3.53 (1.40)	N = 30 3.90 (1.65)	N = 54 3.04 (1.40)	3.27	3.73**
Strodtbeck's Modified V-Scale	N = 121 2.89 (1.74)	N = 154 3.64 (2.09)	N = 125 2.53 (1.79)	N = 61 3.77 (2.13)	N = 31 4.00 (2.41)	N = 58 4.83 (2.28)	3.32	13.67**
Independence from Parents	N = 132 11.64 (2.16)	N = 157 11.19 (2.99)	N - 132 11.64 (2.22)	N = 64 10.95 (2.63)	N = 32 11.47 (2.09)	N = 60 10.68 (3.32)	11.33	1.85
CYS: Authoritarian Discipline	N = 133 18.38 (2.38)	N = 163 19.15 (3.35)	N = 132 18.00 (3.53)	N = 65 20.38 (3.50)	N = 33 19.76 (2.89)	N = 59 20.61 (3.11)	19.03	9.63**
CYS: Neg. Orientation to Society	N = 133 18.98 (2.13)	N = 163 19.98 (2.92)	N = 132 19.07 (2.17)	N = 65 20.69 (2.95)	N = 33 21.24 (3.24)	N = 59 21.78 (3.15)	19.88	14.66**
Cyclothymia vs. Schizothymia	N = 134 33.08 (3.29)	N = 16 33.58 (2.29)	N = 133 33.54 (3.29)	N = 66 34.33 (2.87)	N = 33 33.27 (2.55)	N = 61 33.72 (2.16)	33.54	1.63

subjects in the low potential category had the lowest, at graduation. On Cattell's measure of ego strength vs. dissatisfied emotionality (143, Emotional Stability, p. A-76), the average potential students (AvPo) appeared to be the most stable. The means for types, although statistically different from one another, were of nearly the same magnitude. On Turner's Competetive Preoccupation Scale (132, p. A-75), those with average potential again had the highest mean, but there was little difference between those classified HPr and LoPo. On Strodtbeck's v Ach Scale the competent plodders had the highest mean as one might expect. Similarly, the competent plodders seemed to have a set to accept authoritarian beliefs and the control of authority figures. Again the means differ significantly in a statistical sense but not greatly in magnitude. As one might expect, the twelfth grade students classified as having low potential had the highest scores on the scale for Negative Orientation to Society. In general, the six independent student types vary significantly in terms of statistical "laws of allowed witchcraft," but the magnitudes (with a possible exception of GPA's) are not great enough to excite one about the reality of the classifications.

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APPENDIX A

Section III

DESCRIPTION OF VARIABLES

The number appearing in front of the test variables is for cross reference use with Table A.21 which lists all tests given from Grade VII to Grade XII with Master File Numbers (MFN), Form of Instrument, and Number of Subjects (N).

Criterion Measures

Academic Achievement

Annual Measures

001 GPA Teacher Evaluation. Grade point average derived from teacher evaluations of performance in content subjects (a) English, (b) social studies, (c) mathematics, (d) science for each student during the school year. Grade point averages were computed on a fifteen point scale. The fifteen point scale transformation representing either letter grades of the typical 100 point scale follows.

15-point scale	Letter Grade	100-point scale
15	A+	97-100
14	A	93-96
13	A-	90-92
12	B+	87-89
11	B	83-86
10	B-	80-82
9	C+	77-79
8	C	73-76
7	C-	70-72
6	D+	67-69
5	D	63-66
4	D-	60-62
3	F+	40-59
2	F	20-30
1	F-	0-19

002 CAT Reading. Grade placement scores from California Achievement Tests; different forms used in various grades; two subtests: (a) vocabulary (mathematics, science, social studies, general) and (b) comprehension (following directions, reference skills, interpretations).

003 CAT Language. Grade placement scores from California Achievement Tests; different forms used in various grades; two subtests: (a) mechanics of English (capitalization, punctuation, word usage) and (b) spelling.

004 CAT Arithmetic. Grade placement scores from California Achievement Tests; different forms used in various grades; two subtests: (a) fundamentals (addition, subtraction, multiplication, division) and (b) reasoning (meanings, symbols, rules, equations, problems).

005 STEP Mathematics. The test is designed to provide an instrument for the overall evaluation of an individual or a class with respect to achievement in the broad mathematical objectives of education. The concepts tested are classified as number and operation, symbolism, measurement and geometry, function and relation, proof: deductive and inferential reasoning, probability and statistics. (Cooperative Test Division, 1958).

006 STEP Science. The test is designed to measure two aspects of science education. The two aspects are 1) that the student should acquire knowledge of basic scientific concepts in each major area of science, and 2) that the student should acquire problem solving skills which he needs in the application of scientific knowledge to familiar and unfamiliar situations. The test is limited to the content of the "average" curriculum. The skills tested include 1) the ability to identify and define a scientific problem, 2) the ability to suggest or screen hypothesis, 3) the ability to select validating procedures, 4) the ability to interpret data and draw conclusions, 5) the ability to evaluate critically the claims or statements of others, 6) the ability to reason quantitatively and symbolically. (Cooperative Test Division, 1958)

007 STEP Social Studies. The test is designed to test the students' understanding of 1) the nature of social change and its effect on man's way of living, 2) the effects of geographic environment on man's institutions and ways of living, 3) control over the forces of nature as a major factor in accounting for the ways in which we live today, 4) the nature of a democratic society and the rights, privileges, and responsibilities of free men, 5) the means by which society directs and regulates the behavior of its members, 6) man's economic wants and ways of satisfying them, 7) the ways in which man attempts to understand and adjust to his environment and his place in the universe, 8) the interdependence

among individuals, communities, societies, regions, and nations, 9) the sources of human nature and personality. (Cooperative Test Division, 1958)

Grade XII Measures

074b Scat Ability. Given in twelfth grade in place of CTMM. Described under "Cognitive Attributes."

008 NMSC Products. Self reports as second semester seniors in high school upon 16 criteria of artistic and scientific achievement developed by Holland and Astin (1962b) for the National Merit Scholarship Corporation; namely

1. Won one or more speech contests.
2. Had poems, stories, or articles published in a public newspaper or magazine (not school paper) or in a state or national high school anthology.
3. Won a prize in an art competition (sculpture, ceramics, painting, etc.).
4. Received the highest rating in a state music contest.
5. Received one of the highest ratings in a national music contest.
6. Composed music which has been given at least one public performance.
7. Arranged music for public performance.
8. Had minor roles in plays (not high school or church-sponsored).
9. Had leads in high school or church-sponsored plays.
10. Won literary award or prize for creative writing.
11. Had cartoon published in a public newspaper or magazine.
12. Presented an original paper at a scientific meeting sponsored by a professional society.
13. Won a prize or award in a scientific talent search.

14. Constructed scientific apparatus on own initiative.

15. Invented a patentable device.

16. Had a scientific paper published in a science journal.

009 Teacher Nominations (TN). High school teachers who had taught the HTRP students at least one year were selected to complete the nomination instrument. Because some teachers worked with more than one grade level, these individuals had the opportunity to observe the HTRP students more than one year. The HTRP staff judged that a minimum of one year's experience with the class would allow the teacher to know all members well enough to make the relative judgments required on the nomination instrument. The smallest graduating class was 155; and the largest was 365, with the two intermediate classes being 225 and 330. The following instructions were given to the teachers prior to making the nominations.

> You have worked with the students of this school for some time now. In the process of teaching you have gotten to know a few students quite well and some not so well. Your are going to be asked to focus your attention for a few moments on the kinds of impressions that various students have made upon you, impressions which might be classified as talents or special abilities.
>
> Some students have already manifested various kinds of talent that you have been able to discern but which are not measured by ordinary mental ability tests or even by the speical psychological tests used in the Human Talent Research Program. Consequently, the only way we have of knowing about these students and their talents is to ask you to point them out to us.
>
> In this booklet you will find a roster of the current seniors in your high school. Associated with each name is a five digit code number. You will also find in this booklet a list of 42 different kinds of human talent. Your job will be to look at each type of talent, then scan the roster of seniors to see who you think has the most of that particular ability, and to record your nominations. We would like for you to name as many as three students for each talent.

> Your are requested to respond to as many items as you honestly think you can, but we want you to leave out items for which you feel you have no basis for rating students. For example, an English teacher might feel that he or she doesn't have any way to know about the math ability of a student.
>
> Your nomination will be recorded on the IBM cards provided to you. You must use the special pencil so that the cards can be processed mechanically. Instead of writing the names of the student you nominate for the various talents you will record their code numbers on the IBM cards. This procedure provides anonymity for the students nominated as well as putting the responses in the proper form to be processed in an electronic computer.
>
> A representative of the Human Talent Research Program will give you detailed instructions on how to use the IBM cards.

The 42 items on human talent were given to the teachers following brief verbal instructions on how to use the IBM mark sense cards.

Nominate three students from the list of seniors who:

1. Have the highest academic talent (general intellectual ability).
2. are most talented in the areas of science.
3. have the most mathematical ability.
4. are most creative in the language arts.
5. are most talented in the social sciences.
6. are most talented in mastering foreign languages.
7. are most talented in the artistic areas.
8. are most talented in music.
9. are most talented in dancing as an interpretive art.
10. are most talented in the mechanical arts.
11. are most talented in dramatics.
12. are most talented in athletics.

13. are the most effective leaders.

14. have the best chance of succeeding in college.

15. might make a significant contribution in their profession some time in the future.

16. have the best potential for success in the field of politics.

17. have a high degree of perseverance. These people get things done in spite of many difficult obstacles.

18. are best at working with "things" or tangible objects.

19. are most effective in carrying out assigned tasks.

20. are adept at sensing individual, group, or class feeling.

21. are most skillful at exercising power behind the scene.

22. are best at organizing new clubs, movements, and student groups.

23. have the most social poise in class, at parties, at church, and in other activities.

24. can put their finger on the nature of a problem such as grasping what seems to be the heart of a discussion.

25. can accurately appraise how they are seen by others.

26. seem to understand themselves well. These people have insight into their own feelings and emotions.

27. have social tact. This kind of person is clever and skillful in social relationships but is not obtrusive nor offensive.

28. are likely to operate independently from others in later life.

29. have written or might write a poem, story, or novel that would appeal to a number of readers.

30. might someday become great scholars. People like this make significant contributions in the world of ideas as opposed to applied fields.

31. can synthesize widely different points.

32. can think divergently or come up with unique ideas.

33. can structure into a meaningful whole a group of unstructured ideas, facts, or things.

34. are perceptive enough to see problems that most people skip over.

35. are resourceful at using common objects in unique ways.

36. seem to act as if they can change things in their environment to better suit them.

37. seem to believe that they are victims of circumstances.

38. are both original and fluent in expressing themselves.

39. read both extensively and broadly.

40. are self-disciplined.

41. can solve problems well in their minds without having to write them down.

42. are truly creative.

Peer Nominations (PN). Age-mate evaluations of one another in Grade XII were elicited by the instructions and stimulus-cues which follow. Note that there is a correspondence between earlier PN's listed as Dimensions and the assessments employed as criteria in Grade XII.

Instructions. Please name up to three persons under each heading by writing in their names. Put down the full name along with any nickname. Please restrict the names you write to persons who are in the same grade as you. It is not necessary for all blanks to be filled in.

1. persons about your own age who try to do all kinds of difficult things quickly and well.

2. persons about your age who are sort of "brains." They are boys and girls who get their ideas from books. They tend to do what older people want.

3. persons about your age who really do everything they can to avoid doing poorly in school work. They put lots of effort into everything they have to do and they keep working and trying at things until they are successful or realize they can't be done.

4. persons you could work with, or ask for help on a school problem.

5. persons you would not ask for help if you had to work on a problem.

6. persons about your own age who have good imaginations. They have new ideas and new ways of doing things.

7. persons about your own age whom you may or may not know very well, who have some hidden ability or who have shown a great deal of talent. They should be encouraged and given opportunities to learn in and out of school.

8. persons about your own age, whom you may or may not know very well, who have a lot of ability in dealing with words. These are people who are outstanding speakers or writers.

9. persons who seem to enjoy everything they do. They welcome the chance to do new things.

10. persons about your own age who daydream a great deal. The things they dream and think about often do not make sense.

11. persons about your age who have outstanding artistic ability. They are people who can draw, paint, or design clothes, or make beautiful things.

12. persons about your age who are really good at athletics and sports.

13. persons about your age who are really good in arithmetic.

14. persons about your age who are really good in science.

15. persons about your own age, whom you may or may not know very well, who have outstanding mechanical ability. They are people who have real understanding of tools and machines.

16. persons about your own age, whom you may or may not know very well, who have outstanding musical talent. They are people who sing, play an instrument, or dance very well.

17. persons in your class who come up with the most ideas.

18. who in your class has the most original or unusual ideas.

19. If the situation changed or if a solution to a problem wouldn't work, who in your class would be the first to find a new way of meeting the problem?

20. Who in your class does the most inventing and developing of new ideas, gadgets, and such?

21. Who in your class is best at thinking of all of the details involved in working out a new idea and thinking of all of the consequences?

22. Who in your class is the most effective leader?

23. Who in your class are the "wheels?"

24. Who in your class are the "wild ones?"

25. Who in your class are the "average ones?"

093 Word Association. Given only in twelfth grade. Described in Cognitive Attributes section.

076 STEP Reading. Given only in twelfth grade.

077 STEP Writing. Given only in twelfth grade.

Dimensional Measures

Age-Mate Appraisals

010 IPS Peer Status. Index values computed in grades VII, VIII, and IX from sociographically-weighted positive and negative valuations of members of the age-mate society by peers at each school location after a matrix analysis of the sociometric nominations. (McGuire and Clark, 1952; McGuire, White, and Murphy, 1960.)

011 Peer-Nomination: Wheel. Number of times named by agemates in response to "Name three persons about your age who sort of 'make the wheels go round.' They are the boys and girls who tend to run things wherever they are. 'They're tops.' "

012 Peer-Nomination: Brain. Number of times named by agemates in response to "Name three persons about your age who are sort of 'brains.' They are boys or girls who get their ideas from books. They tend to do what older people want."

014 Peer-Nomination: Quiet Ones. Number of times named by age-mates in response to "Name three persons about your age who are sort of quiet. They're often forgotten or just not noticed."

015 Peer-Nomination: Wild Ones. Number of times named by age-mates in response to "Name three persons about your age who are sort of 'wild ones.' They are boys and girls who could get into trouble."

016 Peer-Nomination: Left Out. Number of times named by age-mates in response to "Name three persons about your age who are 'left out' of things on purpose. They make other people feel uncomfortable."

017 Peer-Nomination: Behavior Model. Number of times named by age-mates in response to "Name three persons you would like to be like."

018 Peer-Nomination: Academic Model. Number of times named by age-mates in response to "Name three persons you could work with, or ask for help, on a school problem."

019 Peer-Nomination: Active. Number of times named by age-mates in response to "Name three persons about your own age who are active in making things come out the way they want them to be. They know what they want and do something about it."

020 Peer-Nomination: Passive. Number of times named by age-mates in response to "Name three persons about your own age who tend to wait and let things happen to them. They are boys and girls who avoid trouble when difficulties arise."

021 Peer-Nomination: Impulsive. "Name three persons about your age who do many things without thinking. They 'don't care' but sometimes they are sorry."

022 Peer-Nomination: Affective Neutrality. Number of times named by age-mates in response to "Name three persons about your own age who think of what might happen before they do anything so they won't feel ashamed of what they have done."

026 Peer-Nomination: Imaginative. Number of times named by age-mates in response to "Name three people about your own age who have good imaginations. They have new ideas and new ways of doing things."

027 Peer-Nomination: Daydreamer. Number of times named by age-mates in response to "Name three people about your own age who daydream a great deal. The things they dream and think about often do make sense."

029 Peer-Nomination: Artist. Transformed distribution of values based upon frequency of nominations of persons "who have outstanding ability" by age-mates in the school locations."

030 Peer-Nomination: Athletic. Transformed distribution of values based upon frequency of nominations of persons "who are really good in athletics and sports" by age-mates in the school location.

032 Peer-Nomination: Mechanical. Transformed distribution of values based upon frequency of nominations of persons "who have outstanding mechanical ability, who have real understanding of tools and machines," and who "build and repair things and really know how things work" by age-mates in the school location.

033 Peer-Nomination: Musical. Transformed distribution of values based upon frequency of nominations of persons "who have outstanding musical ability" and "who sing, play an instrument, or dance very well" by age-mates in the school location.

035 Peer-Nomination: Verbal. Transformed distribution of values based upon frequency of nominations of persons "who have a lot of ability in dealing with words" and "who are outstanding speakers or writers" by age-mates in the school location.

036 Peer-Nomination: Hidden Talent. Transformed distribution of values based upon frequency of nominations of persons "who have some hidden ability" or "who have shown a great deal of talent" by age-mates in the school location.

041 Peer-Nomination: Negative Academic Model. Number of times named by age-mates in response to "Name three persons you would not ask for help if you had to work on a problem."

043 Peer Nomination: Negative Behavior Model. Number of times named by age-mates in response to "Name three persons you would not like to be like."

044 Peer-Nomination: Amoral. Number of times named by age-mates in response to "Name three persons who do whatever they feel like doing a lot of the time. They don't seem to care what they do to other people, or what other people think."

045 Peer-Nomination: Expedient. Number of times named by age-mates in response to "Name three persons who are strictly out for themselves, but they keep an eye on what others think of them. They stick to the rules as long as it gets them what they want.

046 Peer-Nomination: Conforming. Number of times named by age-mates in response to "Name three persons who get along with whatever crowd they are in. They don't do much independent thinking but they can be counted on to do what is expected."

047 Peer-Nomination: Irrational Conscientious. Number of times named by age-mates in response to "Name three persons who have their own set of moral principles and conform to them rigidly --everything is either 'right' or 'wrong.' For example, they may always be 'honest' no matter what effect it may have on others."

048 Peer-Nomination: Rational Altruistic. Number of times named by age-mates in response to "Name three persons who genuinely care about the way their behavior affects other people and they try to think ahead of time so that they will treat others fairly. They have solid moral principles of their own and they try to live up to them."

Cognitive Attributes

074a CTMM Mental Function. Intelligence (IQ) measured by the California Test of Mental Maturity; short forms (SF) for junior (JH) and senior (SH) high school; ability to respond appropriately to language and nonlanguage stimuli having to do with spatial relationships, logical reasoning, numerical reasoning, and verbal concepts. (California Test Bureau, 1957).

074b SCAT Ability. Scores on the verbal and quantitative parts (V + Q) of the Cooperative School and College Abilities Test (SCAT), Form 2A. (Cooperative Test Division, 1955.) Comparable as a measure of ability to CTMM mental function used as a predictor in preceding years.

075 STEP Listening. Scores based upon responses to Sequential Tests of Educational Progress; different forms in grade VII, 3A, grade VIII, 3B, and grade IX, 2A; comprehension of passages and questions read aloud; postulated to be a measure of cognitive apprehension, efficiency in attending to and concentrating upon verbal stimuli during the learning process. (Cooperative Test Division, 1958; Adelson and Redman, 1958.) Whiteside (1964) employs values for STEP Listening as an index of impulse control--attending to verbal stimuli while maintaining affective neutrality.

078 DAT Abstract Reasoning. Scores based upon responses to Differential Aptitude Test, Form A; administered to total population in grade VIII; ability to infer and demonstrate deductions from a series of problem figures. (The Psychological Corporation, 1947.)

079 DAT Space Relations. Scores based upon responses to Differential Attitude Test, Form A; administered to total population in grade VIII; ability to deal with concrete materials through visualization, to manipulate things mentally, or create a structure in one's own mind from a plan by linking graphic patterns and figures.

080 DAT Mechanical Reasoning. Scores derived from responses to Differential Aptitude Test, Form A, in grade VII; pictorially presented mechanical situations with zoning, ability to formulate complex conceptions of many kinds from figural materials, as well as visualization and mechanical experience. (Guilford, Kettner, and Christensen, 1956.)

081 DAT Clerical Accuracy. Scores derived from responses to Differential Aptitude Test, Form A, in grade VII; quickness and accuracy of making comparisons between two lists of letter and number combinations.

082 Gestalt Transformation. Scores derived from Guilford Factor Tests (GFT) responses in grades VII and IX; indicate which of five objects has a part which could be used in carrying out a stated operation; postulated to be a measure of an aspect of conceptual redefinition, ability to shift the function of a part of an object and use it in a new way. (Guilford, 1959; Guilford and others, 1951; Hertzka and others, 1954; Wilson, 1958.)

083 Consequences. Scores derived from GFT responses in grades VII and IX; list different consequences or possible results of changes in human or natural situations; postulated to be a measure of an aspect of conceptual foresight, ability to go beyond what is given and extrapolate outcomes, and to be an element of originality. (Barron, 1955; Frick and others, 1959; Guilford, 1959; Wilson, Guilford, and Christensen, 1953.)

084 Unusual Uses. Scores derived from GFT responses in grades VII and IX; list different uses for common objects; postulated to be a measure of an aspect of spontaneous flexibility, ability to shift from one class of ideas to another , and an element of originality. (Barron, 1955; Frick and others, 1959; Guilford, 1959; Wilson, 1958; Wilson, Guilford, and Christensen, 1953.)

085 Common Situations. Scores derived from GFT responses in grades VII and IX; list problems suggested by everyday situations; postulated to be a measure of an aspect of ideational fluency, ability to call up as many ideas or responses as possible in a given time. (Frick and others, 1959; Guilford, 1959; Wilson, 1958; Wilson and others, 1954.)

086 Rhymes. Scores derived from GFT responses in grade VII; write words that rhyme with given words; presumed to be a measure of an aspect of word fluency or verbal facility; listing words satisfying a specified requirement. (Guilford and others, 1951; Guilford, 1959.)

087 Seeing Problems. Scores derived from GFT responses in grades VII and IX; list problems that might arise in connection

with the structure, use, or operation of common objects; postulated to be a measure of an aspect of sensitivity to problems, awareness that problems exist. (Guilford, 1957; Wilson, 1958; Wilson and others, 1954.)

088 Gestalt Completion. Scores derived from Kit of Reference Tests (KRT) responses in grade VII; identify objects with parts missing; postulated to be a measure of an aspect of symbolic closure, or recognition of symbols. (Guilford, 1957; Wilson and others, 1954.)

089 Mutilated Words. Scores derived from KRT responses in grades VII and IX; identify words composed of partial letters; postulated to be a measure of an aspect of symbolic closure, or recognition of symbols. (Guilford, 1957; Wilson and others, 1954.)

090 Short Words. Scores derived from KRT responses in grades VII and IX; encircle groups of four consecutive letters, embedded in rows of letters, that spell out a common English word; postulated to measure speed of perceptual closure, or ability to cognize symbolic units. (Guilford, 1959.)

091 Dotting. Scores derived from Psychomotor Test II (PMT) responses in grade VII; place three pencil dots in each of a series of small circles, timed; postulated to measure psychomotor speed (Fleishman, 1954).

092 Discrimination Reaction Time. Scores derived from PMT responses in grade VII; place a check mark in an appropriate space according to the position of a white circle in relation to a black circle in a prededing square, timed; postulated to measure discrimination reaction time (Fleishman, 1954).

093 Word Association. This twenty-five item test devised by Getzels and Jackson (1962) is designed to test the student's ability to shift frames of reference within an organized structure. The subject is asked to give as many definitions as possible to fairly common stimulus words (e.g., "bolt," "bark," "sack"). His score depends on the absolute number of definitions and the number of different categories into which these definitions can be put. (I.E., a student obtaining a low score on this instrument might reply to stimulus word "bolt" by saying, "To fasten down; to secure; bolt a door; bolt a hatch on a ship." A student obtaining a high score might say in response to the same stimulus, "To fasten down; to run away quickly; to each food rapidly; a bolt of cloth; a horse bolts; a bolt of lightning.")

Personality Attributes

094 JPQ 1: Emotional Sensitivity vs. Toughness. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "If you read something sad in a story, do you (a) find it hard to keep the tears away, or (b) say, 'Oh! It's only a silly story'?"; similar to tender vs. toughminded factor among adults (Factor I of 16 PF) (Cattell and Associates, 1953; Cattell and Beloff, 1953; Cattell and Gruen, 1954).

096 JPQ 3: Neurotic, Fearful Emotionality vs. Stability or Ego Strength. Scale values derived from JPQ responses in grade VII; twelve items such as "When people play joke on you, do you usually enjoy it too, without feeling at all upset?"; combines two factors recognized among adults as main elements in neuroticism compared with self confidence and ego strength (Cattell and Associates, 1953).

097 JPQ 4: Will Control vs. Relaxed Casualness. Scale values derived from JPQ responses administered in grade VII; twelve items such as, "Do you spend most of your pocket money each week (instead of saving most of it)?" Those who score high tend to be self-controlled, orderly, persistent, punctual, but somewhat inhibited; postulated to be a measure of the degree to which parents have influenced behavior standards and the character of the respondent (Cattell and Associates, 1953).

099 JPQ 6: Cyclothymia vs. Schizothymia. Scale values from JPQ responses in grade VII; twelve items such as "Do you think that people understand and like you?"; sociable, easy-going, and warmhearted contrasted with dislike of groups, some rigidity, and seriousness (Cattell and Associates, 1953).

101 JPQ 8: Socialized Morale vs. Dislike of Education. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "When you have to write an essay about your thoughts on some subject do you (a) sometimes enjoy it, or (b) generally dislike having to do it?"; acceptance of school and cultural standards contrasted with dislike of learning and negative reaction to authority.

102 JPQ 9: Independent Dominance. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "Do you sometimes think there are too many rules and regulations, and that you should be more free to say what you want to do?"; subjects with high scores represent themselves as being dominant, competitive, unrestrained, with some difficulty in communication.

103 JPQ 10: Energetic Conformity vs Quiet Eccentricity. Scale values derived from JPQ responses in grade VII; twelve items such as "Do you find it hard to talk to the captain of a team or

some important boy or girl in school?"; the lively, conforming mixer and the retiring, thoughtful person.

104 JPQ 11: Surgency vs. Desurgency. Scale values derived from JPQ responses in grades VII and IX; twelve items such as "Would you rather spend an evening (a) with the hobby you like most, or (b) at a gay party?"; talkative, excitable, gay, and likes variety, in contrast to being serious, quiet, and interested in detailed, exact undertakings.

Motives and Attitudes

106 SSHA Scholastic Motivation. Scale values derived from SSHA responses in grades VII and IX; fifty-five items such as "Whether I like a subject or not, I still work hard to make a good grade" and "Unless I really like a subject, I believe in only doing enough to get a passing grade"; odd-even reliability .95, with Spearman-Brown correction, in grade VII; postulated to be a measure of academic attitude or motivational orientation towards scholastic achievement (The SSHA instrument yielded a number of subscales which were employed only in the seventh grade: 106a, 106b, 106c, 106d, 106e, 106f.) (Brown, 1956; Brown, McGuire, & Holtzman, 1955; Holtzman, Brown, & Farquhar, 1954; McBee & Duke, 1960).

107 CMAS Anxiety. Scale values derived from Children's Manifest Anxiety Scale responses in grades VII and IX; forty-one items such as "I have trouble making up my mind," "I worry about what my parents will say to me," "My hands feel sweaty," "I worry about what other people think of me," and "It is hard for me to keep my mind on school work"; odd-even reliability .90 with Spearman-Brown correction, in grade VII: postulated to be a measure of underlying anxiety, or the motive to avoid failure, expecially in ego-involving, threatening, or stressful situations (Atkinson, 1957; Casteneda, McCandless, and Palermo, 1956; Phillips, King, and McGuire, 1959; Phillips, Hindsman, and Jennings, 1960).

108 CYS Criticism of Education. Scale values derived from CYS responses in grade VII; ten items such as 'Most teachers are too rigid and narrow-minded" and "It is almost impossible for the average student to do all of his assigned homework"; average item-test reliability .86 in grade VII; postulated to be a measure of a set to be negative toward teachers and critical of what is expected in the school (Moore and Holtzman, 1955, pp. 29).

109 CYS Criticism of Youth. Scale values derived from CYS responses in grades VII and IX; six items such as "Silliness is one of the worst faults of most teen-agers" and "Teen-agers gossip too much about each other"; average item-test reliability .67 in grade VII; postulated to be a measure of a set to find fault with one's age-mates and criticize their behavior, reflecting pressures

toward social conformity manifested by a concern for good appearances (Moore and Holtzman, 1965, pp. 30; Phelps and Horrocks, 1958).

111 CYS Authoritarian Discipline. Scale values derived from Texas Cooperative Youth Studies (CYS) responses in grades VII and IX; nine items such as "Strict discipline develops a fine strong character" and "A person my age should take the school subjects which his parents decide would be best for him"; average item-test reliability .77 in grade VII; postulated to be a measure of a set to accept authoritarian beliefs and the control of authority figures (Frenkel-Brunswik, 1951; Moore and Holtzman, 1965, pp. 28).

112 CYS Negative Orientation to Society. Scale values derived from CYS responses in grades VII and IX; eight items such as "When you get right down to it no one is going to care much what is going to happen to you," "A person should insist on his own rights no matter what the cost," and "If you don't watch yourself, people will take advantage of you"; average item-test reliability .78 in grade VII; postulated to be a measure of an aspect of the alienation syndrome which is marked by distrust, egocentrism, pessimism, resentement, and anxiety (Davids, 1955, 1956; Moore and Holtzman, 1965, pp. 27).

113 CYS Self Inventory. Scale values derived from CYS responses in grade VII; eight items such as "I often have the feeling I will say something wrong"; postulated to be a measure of attitude towards one's own competencies (Moore and Holtzman, 1965, pp. 32).

114 CYS Personal Maladjustment. Scale values derived from CYS responses in grades VII and IX; 21 items such as "Sometimes I feel things are not real," "I get mad and do things I shouldn't do when I can't have my way," "I feel tired all the time," and "Sometimes criticism gets me down"; average item-test reliability .90 in grade VII; postulated to be a measure of ineffective or borderline in contrast to the effective behavior of a mentally healthy individual--misperception of the self and the object world, inability to cope with pressures imposed by others, lack of a sense of identity (This test was later renamed Personal Adjustment) (McGuire, 1956; Moore and Holtzman, 1965, pp. 36-37).

116 CYS Social Inadequacy. Scale values derived from CYS responses in grades VII and IX; twelve items such as "I have trouble making firends easily," "I'm afraid people will laught at me because I'm not sure how to act," and "I don't feel sure how to act on dates"; average item-test reliability .93 in grade VII; postulated to measure an aspect of interpersonal competence in terms of a lack of ability to interpret the intentions of others and an inability to form person-to-person relationships (Foote and Cottrell, 1955; Moore and Holtzman, 1965, pp. 37-38).

169

122 NNAS Aggression Anxiety. Self report variable based upon responses to Need-Need Anxiety Scales in grades VII and IX; ten items such as "I hate any form of argument and will go out of my way to avoid it"; anxiety about one's own aggressive behavior or tendencies and about the discomfort which may result in other people (Cattell and Scheier, 1958; Galliani, 1960).

124 NNAS Achievement. Self report variable based upon responses in grades VII and IX to the Need-Need Anxiety Scales; ten items such as "I set very high goals for myself which I try to reach"; seeking out situations in which evaluations of standards of excellence are easily made and in which one has good chances of rating high (Child, Frank, and Storm, 1956; Galliani, 1960; Storm, Rosenwald and Child, 1958).

125 NNAS Aggression. Self report variable based upon responces in grades VII and IX to Need-Need Anxiety scales; ten items such as "I like lively discussions with people whose opinions differ from mine, because it gives me a chance to tell them just what I think of their ideas"; willingness to coerce or injure another person when threatened or frustrated (Child, Frank, and Storm, 1956; Galliani, 1960; Veroff, 1957).

Cultural Pressures

130a ISS Family Status. Index of social status derived from weighted values (McGuire and White, 1955) for occupation, source of income, and education of the status parent as reported on an identification blank and checked with informants in grades VII, VIII, and IX; index values may be converted to estimates of social class of the family in the community; namely, upper class (UC), 12 to 21; upper middle (UM), 22 to 36; lower middle (LM), 37 to 51; upper lower (UL), 52 to 66; lower lower (LL), 67 to 84; postulated to be an indicator of variations in learning experiences in pressures and reinforcements from members of the family, and in expectations held for the boy or girl by school people (The "Index of Value Orientations," 130b, was employed only in the seventh grade.) (McGuire, 1953, 1954; McGuire and White, 1957; Warner, Meeker, and Eels, 1949).

131 CYS II Family Tensions. Postulated to be a measure of responses to parental restrictions and/or manipulative controls, culminating in resentment and hostility (e.g., "Everyone in my family seems to be against me" and "My parents often object to the kind of boys and girls I go around with") (Moore and Holtzman, 1965).

Attributes of High School Seniors

132 Competitive Preoccupation. The 8-item Guttman-type scale devised by Turner (1960) is designed to measure the extent to which the individual sees relations with those about him as competitive (e.g., "I usually feel a little uncomfortable with an acquaintance who I know can outdo me in one or two things").

133 Social Acceptance Preoccupation. The 8-item Guttman-type scale devised by Turner (1960) is designed to measure the extent to which the individual is preoccupied with being well liked or socially accepted by those with whom he comes in contact (e.g., "I can't stand the thought that there are people who aren't my friends").

134 Strodtbeck v Ach Scale. The instrument is designed to measure degree of achievement valuation (Strodtbeck, 1958) employing ten items, eight of which were keyed "disagree" (e.g., "Planning only makes a person unhappy since your plans hardly ever work out" and "A person should stay near one's parents when the time comes to take a job, even if it means giving up a good opportunity elsewhere").

135 Independent from Parents. The questionnaire devised by Psathas (1957) used sixteen items. It was designed to measure the extent to which the individual is independent from parental control (e.g., "Are you allowed trips out of town without parents").

136 Superego Strength (Factor G of 16-PF, Form A). The measure of "character vs. lack of internal standards" has ten items depicting regard for moral standards (e.g., "If I saw two neighbors' children fighting I would : 1) leave them to settle it, 2) uncertain, 3) reason with them"). Refer to Handbook or Cattell (1957, pp. 122-126). Similar to JPQ 11, Talkative and excitable vs. serious and quiet.

137 Premsia vs. Harria or "Protected Emotional Sensitivity vs. Hard Realism" (Factor I of 16-PF, Form A). The ten items are designed to reflect "emotional" sensitivity vs. tough maturity" (e.g., "I would rather be: 1) a construction engineer, 2) uncertain, 3) a teacher of social studies"). Refer to Handbook or Cattell (1957, pp. 131-136). Similar to JPQ 1, Emotional sensitivity vs. toughness.

138 de Charms v Ach Scale. The 9-item scale (de Charms et al, 1955) also is designed to measure values toward achievement (e.g., "I enjoy work as much as play," and "I nearly always strive for personal achievement").

139 Edwards Social Desirability Scale. The SD scale (from Edwards, 1957) is designed to provide a measure of the tendency of subjects to give socially desirable responses in self-descriptions under standard instructions (Edwards, 1961). The HTRP form has ten items (e.g., "I am happy most of the time," "The main thing in life is for a person to want to do something important").

140 Dogmatism. The D-scale (Rokeach, 1960) is designed to measure the degree to which a person has a relatively closed cognitive system of beliefs and disbeliefs about reality (Rokeach, 1954). The HTRP form has forty items and permits six levels of agreement-disagreement (e.g., "The United States and Russia have just about nothing in common" and "Of all the different philosophies which exist in this world, there is probably only one which is correct").

141 Balanced F Scale. This measure of authoritarianism had forty items from Forms 45 and 40 of the scale published by Adorno et al (1950) (e.g., "Astrology is a pseudo science and really doesn't explain anything" and "Every person should have complete faith in some supernatural power whose decisions he obeys without question"). The earlier HTRP scale for authoritarianism (submission, aggression) was CYS Authoritarian Discipline (Moore and Holtzman, 1965, pp. 27-28).

142 Cyclothymia vs. Schizothymia (Factor A of 16-PF, Form A). The 10-item scale reflects "participating vs. standoff." Responses to items indicate the degree to which a person prefers occupations dealing with people and socially impressive situations instead of working alone and avoiding clashes of viewpoints (e.g., "I would prefer to work in a business: 1) keeping accounts and records, 2) in between, 3) talking to customers"). Refer to the 16-PF Handbook by Cattell, Saunders & Stice (1957) or an account of the factor by Cattell (1957, pp. 90-99). Similar to JPQ-6, Adventurous cyclothymia vs. withdrawn schizothymia.

143 Emotional Stability (Factor C of 16-PF, Form A). The scale measures "ego strength vs. dissatisfied emotionality" (or "mature vs. childish") by having the subject respond to twelve items. The items permit responses which may indicate annoyance by things and people, dissatisfactions, and/or generalized neurotic symptoms (e.g., "I generally find enough energy to face my difficulties: 1) always, 2) generally, 3) seldom"). Refer to the 16-PF Handbook by Cattell, Saunders, & Stice (1957) as well as to Cattell (1957, pp. 99-108). Similar to JPQ-3, Emotional instability vs. ego strength.

144 Dominance vs. Submission (Factor E of 16-PF, Form A). The assertive, self-assured person is reflected in responses to twelve items (e.g., "I make smart, sarcastic remarks to people if I think they deserve it: 1) generally, 2) sometimes, 3) never").

Refer to the 16-PF Handbook or to Cattell (1957, pp. 108-109). Similar to JPQ-9, Independent dominance.

145 SxD Value Achievement. The value for each subject is a product of the Strodtbeck v Ach (S) and the de Charms v Ach (D) scores as employed by Liberty (1962, pp. 19, 38).

146 D-S Agreement Response Set. The value for each subject is the difference between the Strodtbeck v Ach score and the de Charms v Ach score as employed by Liberty (1962, pp. 27, 36).

147 Surgency vs. Desurgency (Factor F of 16-PF, Form A). This measure of "Enthusiastic vs. Depressive Anxiety" has thirteen items which indicate degree of "extroversion" vs. "fearful inhibition." (e.g., "I sometimes make rash remarks in fun just to surprise people and see what they will say: 1) yes, 2) in between, 3) no"). Refer to 16-PF Handbook or to Cattell (1957, pp. 112-120). Similar to JPQ-11, Talkative and excitable vs. serious and quiet.

149 Bown Self-Report Inventory. The SRI is made up of forty-eight items representing eight factorially distinct areas of the "phenomenal world": (1) Self, (2) Others, (3) Children, (4) Authority, (5) Work, (6) Reality, (7) Parents, (8) Hope. Subjects respond to each item by indicating on a five point scale (running from "very much like me" to "very much unlike me") the extent to which the item expresses their feelings and attitudes. The inventory yields eight subscores representing positiveness of attitude in each area, a total score (the sum of all subscores) and a ratio of attitudes towards others (others, authority, parents) in relation to attitudes toward self (self, work, reality).

150 Students' General Information. The HTRP Students' General Information Instrument was adapted from an attitude questionnaire of the Study of High School Social Climates (Coleman, 1961). It is designed to learn about the interests and attitudes of high school students in various kinds of high school situations.

151 Post Graduate Information. Graduating seniors were asked to respond to a questionnaire concerning their plans after graduation. Possible responses included: get married; get married and work; get married and go to college; go to college; enter military service; go to trade school; get a job; become an apprentice; other.

Attributes of High School Seniors

152 Teachers' Senior Attitude Inventory. The Senior Attitude Inventory (SAI) was administered to teachers. The SAI is composed of eighty items yielding four (4) scale scores. The

scales are the dogmatism scale, de Charms value achievement scale, Edwards social desirability scale, and the balanced F scale.

153 Teacher Questionnaire. The teacher questionnaire is designed to measure the teacher's awareness and opinion of student values, i.e., "Thinking only of the following four things, just how important do you think they should be for a teen-ager? (Rank items from 1 to 4.) a) pleasing their parents, b) learning as much as possible in school, c) living up to religious ideals, d) being accepted and liked by other students."

154 Teacher Biographical Information. This instrument is designed to obtain family, occupational, educational, and cultural backgrounds of teachers so as to be able to assess their value systems and biases.

APPENDIX A

Section IV

BASIC DATA TABLES

The fourth section of Appendix A permits a reader to gain a picture of the data attained from the HTRP subjects from 1957 to 1963 and the ways in which dimensional variables combined to be the components of factor variables for which "factor scores" could be computed for each participant responding to the HTRP instruments.

Table A.21 shows when a form of each instrument used to represent a dimensional variable (predictor or criterion) was administered, the master file number (MFN) for recovery of scores (or index values), and the number of HTRP respondents for that administration. Relevant distribution statistics are summarized in Table A.23 and intracorrelations among the seventh, ninth, and twelfth grade distributions appear in Table A.23. Further studies of the "stability" of measures over time similar to the report upon "Sex Role and Community Variability in Test Performance" (McGuire, 1961) are to be published.

The impression one receives from examining Table A.23 is that the stability of measures over the periods of time in which the students are in secondary schools varies according to the measure and according to the time interval. For example, there is a great deal of unexplained variance in the cognitive tests measuring convergent thinking (CTMM, Step Listening, Gestalt Transformation), the single test of symbol aptitude (Short Words), and a test of divergent thinking (Common Situations) from the seventh to the twelfth grade. On the other hand, pupil nominations of "Brains" are relatively stable from grades seven to nine (r = .607) and from grades nine to twelve (r = .735) but not from grades seven to twelve (r = .045).

TABLE A.21

Summary of Data Gathered in the Human Talent Research Program from Grade VII (1957-58) to Grade XII (1962-63) with Master File Numbers (MFN), Form of Instrument, and Number of Subjects (N).

	Designation of Variable		VII 1957-58	VIII 1958-59	IX 1959-60	X 1960-61	XI 1961-62	XII 1962-63
001	GPA Teacher Evaluation	MFN	101	181	372	427	516	811
		Form						
		N	1453	1182	992	1098	158	928
001a	English Grade				393	797	801	805
					1284	941	932	789
001a	Math Grade				394	798	802	806
					1245	798	676	444
001b	Social Science Grade				395	799	803	807
					1059	403	896	577
001c	Science Grade				393	800	804	808
					983	773	406	286
002	CAT Reading Total		4	153	215	424		
			JH-X	JH-W	ADY			
			1450	1369	1210	183		
002a	CAT Reading Comprehension		3	152	213	424		
			JH-X	JH-W	ADY			
			1450	1369	1180	183		
002b	Reading Vocabulary		2	151	214	424		
			JH-X	JH-W	ADY			
			1450	1369	1030	183		
003	CAT Language Total		7	156	218	424		
			JH-X	JH-W	ADY			
			1477	1302	1085	183		

Designation of Variable		VII	VIII	IX	X	XI	XII
003a	CAT Mechanics of English	5	154	216	216	424	
		JH-X	JH-W	ADY			
		1477	1305	1111	183		
003b	CAT Spelling	6	155	217	424		
		JH-X	JH-W	ADY			
		1477	1302	1138	183		
004	CAT Arithmetic Total	10	159	221	424		
		JH-X	JH-W	ADY			
		1446	1394	1162	181		
004a	CAT Arithmetic Fundamentals	9	158	220	424		
		JH-X	JH-W	ADY			
		1446	1394	1137	181		
004b	CAT Arithmetic Reasoning	8	157	219	424		
		JH-X	JH-W	ADY			
		1446	1394	1137	181		
005	STEP Mathematics		165	211			606
				3B			2A
			1073	971			973
006	STEP Science	12	164	209			603
		3A	3B	3A			2A
		1470	1301	1149			960
007	STEP Social Studies	11	162	210			605
		3A	3B	3A			2A
		1494	1361	1173			973
008	NMS National Merit Scholarship Criteria						633
						Self-Report	(600)
							870
009	Teacher Nominations for Talent Criteria						665
							870
011	Peer Nominations: Wheels	70					659
		1646					870

Designation of Variable		VII	VIII	IX	X	XI	XII
012	Peer Nomination: Brains	71		364			518
				I 13			
		1646		1250			870
013	Peer Nomination:	74					661
	Average Ones						
		1646					870
014	Peer Nomination:	75		346			532
	Quiet Ones			I 7			
		1646		1250			870
015	Peer Nomination:	76					660
	Wild Ones						
		1629					870
016	Peer Nomination:	77		348			530
	Left Out			I 9			
		1646		1250			870
017	Peer Nomination:	89		340			526
	Behavior Model			I 1			
		1425		1250			870
018	Peer Nomination:	82		356			520
	Academic Model			I 15			
		1426		1250			870
019	Peer Nomination:	85					538
	Active						
		1426					870
020	Peer Nomination:	86					539
	Passive						
		1426					870
021	Peer Nomination:	98					540
	Impulsive						
		1425					870
022	Peer Nomination:	99					541
	Affective Neutral						
		1425					870

Designation of Variable		VII	VIII	IX	X	XI	XII
023	Peer Nomination:	95		350			533
	Adult Oriented			I 11			
		1425		1250			870
024	Peer Nomination:	96					537
	Peer Oriented						
		1425					870
025	Peer Nomination:	97					542
	Independent						
		1425					870
026	Peer Nomination:	72		344			522
	Imaginative			I 5			
		1629		1250			870
027	Peer Nomination:	73					545
	Daydreamer						
		1629					870
028	Peer Nomination:	94					
	Actor						
		1425					
029	Peer Nomination:	91					546
	Artist						
		1425					870
030	Peer Nomination:	92					547
	Athletic						
		1425					870
031	Peer Nomination:	93		342			548
	Math Ability			I 3			
		1425		1250			870
032	Peer Nomination:	79					550
	Mechanical						
		1426					870
033	Peer Nomination:	78					551
	Musical						
		1426					870

Designation of Variable		VII	VIII	IX	X	XI	XII
034	Peer Nomination:	144					549
	Science Ability						
		---					870
035	Peer Nomination:	80		352			524
	Verbal			II 1			
		1426		1250			870
036	Peer Nomination:	81		354			523
	Hidden Talent			II 3			
		1426		1250			870
037	Peer Nomination:	84		360			525
	Party With			II9			
		1426		1250			870
038	Peer Nomination:	148		361			528
	Not Party With			II 10			
		1426		1250			870
039	Peer Nomination:	68					
	Self-Behavior						
		1078					
040	Peer Nomination:	69					
	Others-Behavior						
		1041					
041	Peer Nomination:	83		358			521
	Negative Academic Model			II 7			
		1426		1250			870
042	Peer Nomination:	88		341			529
	Negative Personal Model						
		1426					
043	Peer Nomination:	90		341			529
	Negative Behavior Model			I 2			
		1425		1250			870
044	Peer Nomination: Amoral		176				552
			P 10				
			1420				

Designation of Variable	VII	VIII	IX	X	XI	XII
045 Peer Nomination: Expedient		177				553
		P 11				
		1420				1624
046 Peer Nomination: Conforming		178				554
		P 12				
		1420				1624
047 Peer Nomination: Conscientious		170				555
		P 13				
		1420				1624
048 Peer Nomination:		180				556
Rational Altruistic		P 14				
		1420				1624
049 Peer Nomination: Gets By		182	343			536
		P 1	I 4			
		1420	1250			870
050 Peer Nomination:		184	345			
Enjoys Everything		P 2	I 6			
		1420	1250			
051 Peer Nomination:		184				
Desires Approval		P 3				
		1420				
052 Peer Nomination:		185	347			
Self-Confident		P 4	I 8			
		1420	1250			
053 Peer Nomination:		186	349			531
Shows Initiative		P 5	I 10			
		1420	1250			870
054 Peer Nomination:		187	351			535
Lacks Initiative		P 6	I 12			
		1420	1250			870
055 Peer Nomination:		188	353			534
Dislikes School		P 7	I 12			
		1420	1250			870

Designation of Variable	VII	VIII	IX	X	XI	XII
056 Peer Nomination: Likes School		189 P 8 1420				
057 Peer Nomination: Fears Failure		190 P 9 1420	357 I 16 1250			
058 Peer Nomination: Values Learning			355 I 14 1250			
059 Peer Nomination: Works Effectively			359 I 18 1250			
060 Peer Nomination: Seeks Recognition			363 II 11 1250			
061 Peer Nomination: Overcomes Difficulty			363 II22 1250			
062 Peer Nomination: Achieved Results			365 II 14 1250			
063 Peer Nomination: Enjoys Work			366 II 15 1250			
064 Peer Nomination: Unfriendly						543 870
065 Peer Nomination: Easily Upset (Irritable)						651 870
066 Peer Nomination: Most Ideas						652 870

Designation of Variable		VII	VIII	IX	X	XI	XII
067	Peer Nomination: Unusual Ideas						652 870
068	Peer Nomination: New Way of Meeting Problems						653 870
069	Peer Nomination: New Ideas						654 870
070	Peer Nomination: Best at thinking of the details involved in working out a New Idea and thinking of all the Consequences.						655 870
071	Peer Nomination: Most Effective Leader						656 870
072	Peer Nomination: Prettiest Girl						657 870
073	Peer Nomination: Most Popular with the Girls						658 870
074a	CTMM Mental Function	1 1957 SF.JH 1417		212 1957 SF.SH 847	419 327		
074b	SCAT (T = V + Q) Ability Test						809 2A 879
075	STEP Listening	13 1957 3A 1471	163 3B 1357	225 2A 992			602 2A 961
076	STEP Reading						601 2A 427

Designation of Variable		VII	VIII	IX	X	XI	XII
077	STEP Writing						604
							2A
							434
078	DAT Abstract Reasoning		160	408	503		
			A				
			508	320	971		
079	DAT Space Relations		161	409	504		
			A				
			509	322	378		
080	DAT Mechanical Reasoning	143			410	505	
		A					
		1577			313	390	
081	DAT Clerical Speed & Accuracy	142			411	506	
		A				A	
		1581			314	794	
082	Gestalt Transformation	16		279			611
							G.T.I.
		1653		1173			948
083	Consequences	24		283			
		1448		1298			
084	Unusual Uses	22		284			
		1484		1171			
085	Common Situations	23		282			857
				SH 1, 5, 2			
		1435		1263			---
086	Rhymes	21				510	
		1487				978	
087	Seeing Problems	20		285			
				SH 1, 5, 2			
		1466		1169			

Designation of Variable	VII	VIII	IX	X	XI	XII
088 Gestalt Completion	17 1469					
089 Mutilated Words	18 1442		280 1243		511 159	
090 Short Words	14 1470		281 1242		509 962	
091 Dotting	58 1443					
092 DRT-Discrimination Reaction Time	61 1420					
093 G & J Word Association						557 Phase I 953
094 JPQ-1 Emotional Sensitivity vs. Toughness	39 1453		267 BD 5 1264			
095 JPQ-2 Neurotic Tension vs. Autonomic Relaxation	40 1454					
096 JPQ-3 Neurotic Emotionality vs. Stability	41 1454					617 PFII 949
097 JPQ-4 Will Control vs. Relaxed Casualness	42 1454					
098 JPQ-5 Impatient Dominance	43 1454					

Designation of Variable	VII	VIII	IX	X	XI	XII
099 JPQ-6 Cyclothymia vs. Schizothymia	44 1454					616 PFII 949
100 JPQ-7 Adventurous Cyclothymia vs. Withdrawn Schizophrenia	45 1454					
101 JPQ-8 Socialized Morale vs. Dislike of Education	46 1454		268 BD 6 1264			
102 JPQ-9 Independent Dominance	47 1459		269 BD 7 1264			618 PFII 949
103 JPQ-10 Energetic Conformity vs. Quiet Eccentricity	48 1454					
104 JPQ-11 Surgency vs. Desurgency	49 1454		270 BD 8 1264			619 PFII 949
105 JPQ-12 Intelligence	50 1454					
106 SSHA Scholastic Motivation	51 1397		256 AC 1 1408			
106a SSHA Study Habits	52 1397					
106b SSHA Educational Philosophy	53 1396					
106c SSHA Teacher Evaluation	54 1396					

Designation of Variable	VII	VIII	IX	X	XI	XII
106d SSHA Achievement Drive	55 1397					
106e SSHA Procrastination	56 1397					
106f SSHA Self-Confidence	57 1397					
107 CYS I CMAS Anxiety	25 1458		263 BD I 1298			612 948
108 CYS I Criticism of Education	26 1458					
109 CYS I Criticism of Youth	27 1438		266 BD 4 1398			614 948
110 CYS I Family Problems	28 1458					
111 CYS I Authoritarian Discipline	29 1458		265 BD 3 1398			613 948
112 CYS I Orientation to Society	30 1458		264 BD 2 1398			615 948
113 CYS I Self Inventory	31 1458					
114 CYS II Personal Maladjustment	32 1464		258 AC 3			622 PFII 949

Designation of Variable	VII	VIII	IX	X	XI	XII
115 CYS II Resentment of Family Life Style	33 1399					
116 CYS II Social Inadequacy	34 1464		257 AC 2 1408			623 PFII 949
117 CYS II Social Isolation	36 1399					
118 CYS II Resentment of Dependency	37 1399					
119 CYS II Family Troubles	38 1398					
120 Need Nurturance		166 1398				
121 Need Autonomy Anxiety		167 1337				
122 Need Aggression Anxiety		168 1339	259 AC 4 1408			
123 Need Autonomy		169 1341				
124 Need Achievement		170 1341	260 AC 5 1408			
125 Need Aggression		171 1315	261 AC 6 1408			

Designation of Variable		VII	VIII	IX	X	XI	XII
126	Need Dominance Anxiety		172				
			1337				
127	Need Isolation Anxiety		173				
			1331				
128	Need Achievement Anxiety		174	262			
				AC 7			
			1336	1408			
129	Need Dominance		175				
			1333				
130a	Index of Social Status	62		371			858
		1198		945			880
130b	Index of Value Orientations	63					
		1252					
131	CYS II Family Tension	35					
		1464					
132	Competitive Pre-Occupation Scale						607
							883
133	Social Acceptance Pre-Occupation						608
							931
134	Strodtbeck's Modified V-Scale						609
							889
135	Independence from Parents						610
							933

Designation of Variable	VII	VIII	IX	X	XI	XII
136 Character or Super Ego Strength vs. Lack of Rigid Internal Standards						620 PFII 949
137 Premsia vs. Harria						621 PFII 849
*138 de Charms Achievement Scale			SAI			
*139 Edwards Social Desirability			SAI			
*140 Dogmatism Scale			SAI			
*141 Balanced F Scale			SAI			
*142 Cyclothymia vs. Schizothymia						
*143 Emotional Stability						
*144 Dominance vs. Submission						
*145 S x D Value Achievement						
*146 D-S Agreement Response Set						
*147 Sugency vs. Desurgency						

* Where no MFN is shown, data have been gathered but not analysed

Designation of Variable	VII	VIII	IX	X	XI	XII
148 Senior Attitude Inventory (SAI)*						644 870
149 Bown Self-Report Inventory (SRI)						775 R-3 809
*150 Students General Information (from Coleman's Adolescent Society)						
151 Post Graduation Information						600 870

Designation of Variable	VII	VIII	IX	X	XI	XII
*152 Teacher's Senior Attitude Inventory						633 870
*153 Teacher Questionnaire (from Coleman's Adolescent Society)						
*154 Teacher Biographical Information						
155 Vocabulary Completion	15 1439					
156 Writing X's	59 1443					
157 Copying Test	60 1443					
158 Writing Lack	19 1371					
159 Peer Nomination: Where I Fit In	65 1259					
160 Peer Nomination: Where My Friends Fit In	66 1269					
161 Peer Nomination: Where I Would Like To Fit In	67 1264					
162 Peer Nomination: Personal Model	87 1426					
163 DAT: Verbal				406 327		

Designation of Variable	VII	VIII	IX	X	XI	XII
164 DAT: Numerical				407		
				325		
165 DAT: Spelling				412		
				324		
166 DAT: Sentences				413		
				315		

TABLE A.22

Distribution Statistics with Master File Number (MFN) of Variables in Human Talent Research Program (HTRP) for Students in Grades VII, IX, X, and XII.

	Grade VII 1957-58				Grade IX 1959-60				Grade X 1960-61				Grade XII 1962-63			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
CTMM Mental Function	1	1417	95.888	27.918	212	847	101.438	14.249	419	327						
SCAT (T=V+Q) Ability Test													809	879	66.967	19.204
STEP Listening	13	1471	48.331	13.972	225	992	39.486	11.958					602	961	42.671	17.263
STEP Reading													601	427		
STEP Writing													604	435		
STEP Mathematics					211	971							606	973		
STEP Science	12	1470			209	1149							603	960		
STEP Social Studies	11	1494			210	1173							605	973		
NMS National Merit Scholarship Criteria													633	870		
GPA Teacher Evaluation	101	1453			372	992			427	1098			811	928		
DAT Abstract Reasoning					160	508	60.137	29.907	408	320			503	971	28.233	13.209
DAT Space Relations			32.034	20.293	161	509	32.147	20.471	409	322			504	378		

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
DAT Mechanical Reasoning	143	1577	20.086	11.279					410	313			505	390		
DAT Clerical Speed & Accuracy	142	1481	5.018	1.399					411	314			506	794		
Gestalt Transformation	16	1653	6.507	2.958	279	1173	7.948	3.364					611	948	30.577	11.446
Consequences	24	1448	28.213	11.656	283	1298	5.167^{s}	1.454								
Unusual Uses	22	1484	6.028	3.252	284	1171	5.180^{s}	1.452								
Common Situations	23	1435	29.860	10.931	282	1295	5.136	1.454					857	949	20.450	8.868
Rhymes	21	1487	16.086	7.675									510	978	39.727	31.335
Seeing Problems	20	1466	21.364	8.156	285	1120	5.066^{s}	1.471								
Gestalt Completion	17	1469	32.846	8.313												
Mutilated Words	18	1442	18.283	5.607	280	1243	5.157^{s}	1.480					511	159		
Short Words	14	1470	14.138	5.616	281	1242	5.080^{s}	1.435					509	962	22.988	10.270
Dotting	58	1443	105.915	25.010												
DRT- Discrimination Reaction Time	61	1420	36.760	14.035												
G & J Word Association													557	953	40.747	10.947
JPQ-1 Emotional Sensitivity vs. Toughness	39	1453	6.698^{c}	3.100	267	1264	111.531^{c}	3.902								
JPQ-2 Neurotic Tension vs. Autonomic Relaxation	40	1454														
JPQ-3 Neurotic, Emotionality vs. Stability	41	1454	4.030	2.141									617	949	36.885	12.902

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
JPQ-4 Will Control vs. Relaxed Casualness	42	1454	7.082	2.085												
JPQ-5 Impatient Dominance	43	1454														
JPQ-6 Cyclothymia vs. Schizothymia	44	1454	7.194	1.973									616	949	30.143	10.683
JPQ-7 Adventurous Cyclothymia vs. Withdrawn Schizophrenia	45	1454														
JPQ-8 Socialized Morale vs. Dislike of Education	46	1454			268	1264										
JPQ-9 Independent Dominance	47	1459	5.117	2.178	269	1264							618	949	34.218	12.037
JPQ-10 Energetic Conformity vs. Quiet Eccentricity	48	1454	6.933	1.736												
JPQ-11 Surgency vs. Desurgency	49	1454	6.153^c	2.250	270	1264	112.414^c	13.976					619	949	36.201	12.805
JPQ-12 Intelligence	50	1454														
Vocabulary Completion	15	1439														
SSHA Scholastic Motivation	51	1397	53.831^c	18.494	256	1408	95.412^c	16.017								
SSHA Study Habits	52	1397														
SSHA Educational Philosophy	53	1396														
SSHA Teacher Evaluation	55	1397														
SSHA Achievement Drive	55	1397														

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
SSHA Procrastination	56	1397														
SSHA Self-Confidence	57	1397														
CYS I CMAS Anxiety	25	1458	33.722^c	15.535	263	1398	92.868^c	17.995					612	948	33.918	18.178
CYS I Criticism of Education	26	1458	14.366	3.782												
CYS I Criticism of Youth	27	1438	5.860^c	2.356	266	1398	99.969^c	12.435					614	948	19.899	7.785
CYS I Family Problems	28	1458														
CYS I Authoritarian Discipline	29	1458	8.612^c	3.260	265	1398	97.837^c	12.574					613	948	17.022	6.742
CYS I Orientation to Society	30	1458	7.818^c	2.767	264	1398	6.952^c	2.859					615	948	17.809	6.882
CYS I Self Inventory	31	1458														
CYS II Personal Maladjustment	32	1464	13.175^c	6.944	258	1408	90.264^c	14.162					622	949	12.863	8.773
CYS II Resentment of Family Life Style	33	1399														
CYS II Social Inadequacy	34	1464	6.485^c	4.679	257	1408	89.491^c	12.648					623	949	16.815	7.675
CYS II Family Tension	35	1464														
CYS II Social Isolation	36	1399														
CYS II Resentment of Dependency	37	1399														

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
CYS II Family Troubles	38	1398														
Index of Social Status	62	1198	43.828	21.211	371	945	53.089	14.283					585	880	42.130	31.057
Index of Value Orientations	63	1252														
Index of Peer Status	64	1318	4.749	2.620	859	1239										
Writing X's	59	1443														
Copying Test	60	1443														
CAT Reading Vocabulary	2	1450			214	1030			424	183						
CAT Reading Comprehension	3	1450			213	1180			424	183						
CAT Reading Total	4	1450			215	1210			424	183						
CAT Mechanics of English	5	1477			216	1131			424	183						
CAT Spelling	6	1477			217	1138			424	183						
CAT Language Total	7	1477			218	1085			424	183						
CAT Arithmetic Reasoning	8	1446			219	1137			424	181						
CAT Arithmetic Fundamentals	9	1446			220	1137			424	181						
CAT Arithmetic Total	10	1446			221	1162			424	181						
Writing Lack	19	1371														

	Grade VII				Grade X				Grade IX				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
PN: Where I Fit In	65	1259														
PN: Where My Friends Fit In	66	1269														
PN: Where I Would Like to Fit In	67	1264														
PN: Wheels	70	1646	44.131	88.018									659	870	6.831	13.756
PN: Brains	71	1646	45.068	104.834	364	1250	3.854	11.305					518	870	6.706	12.662
PN: Average Ones	74	1646											661	870		
PN: Quiet Ones	75	1646	34.116	88.321	346	1250	5.274	1.304					532	870	3.747	4.907
PN: Wild Ones	76	1629	46.516	159.860									660	870	4.484	4.933
PN: Left Out	77	1646	39.080	130.058	348	1250	5.304	1.281					530	870	2.804	3.885
PN: Personal Model	87	1426														
PN: Behavior Model	89	1425	3.889	3.737	340	1250	5.1662	1.361					562	870	4.963	7.152
PN: Academic Model	82	1426	2.987	2.535	356	1250	4.236	5.540					520	870	3.911	3.771
PN: Active	85	1426	3.846	3.372			3.644	7.958			3.127	7.275	538	870	5.431	7.924
PN: Passive	86	1426	2.138	1.318			4.510	9.529					539	870	2.518	1.863
PN: Impulsive	98	1425	2.244	1.923									540	870	3.398	3.133
PN: Affective Neutral	99	1425	2.861	2.283									541	870	3.190	3.089
PN: Adult Oriented	95	1425			350	1250							533	870		

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
PN: Peer Oriented	96	1425											537	870		
PN: Independent	97	1425											542	870		
PN: Imaginative	72	1629	64.386	181.010	344	1250	5.387	1.349					522	870	3.534	4.606
PN: Daydreamer	73	1629	45.981	146.552									545	870	2.324	1.865
PN: Actor	94	1425														
PN: Artist	91	1425											546	870		
PN: Athletic	92	1425											547	870		
PN: Math Ability	93	1425			342	1250							548	870		
PN: Mechanical	79	1426											550	870		
PN: Musical	78	1426											551	870		
PN: Science Ability	144												549	870		
PN: Verbal	80	1426			352	1250							524	870		
PN: Hidden Talent	81	1426			354	1250							523	870		
PN: Party With	84	1426			360	1250							525	870		
PN: Not Party With	148	1426			361	1250							528	870		
PN: Self-Behavior	68	1078														
PN: Others-Behavior	69	1041														

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
PN: Negative Academic Model	83	1426	2.411	2.253	358	1250	3.738	5.741					521	870	3.291	2.473
PN: Negative Personal Model	88	1426														
PN: Negative Behavior Model	90	1425	3.158	4.799	341	1250	5.194	1.288					529	870	3.368	3.278
DAT: Verbal									406	327			501	507		
DAT: Numerical									407	325			502	555		
DAT: Spelling									412	324			507	376		
DAT: Sentences									413	315			508	378		
ITED																
Need Nurturance					166	1398										
Need Autonomy Anxiety					167	1337										
Need Aggression Anxiety					259	1408										
Need Autonomy					169	1341										
Need Achievement					260	1408										
Need Aggression					261	1408										
Need Dominance Anxiety					172	1337										
Need Isolation Anxiety					173	1331										
Need Achievement Anxiety					262	1408										
Need Dominance					175	1333										
PN: Amoral			3.605	3.144	176	1420	3.981	4.348					522	1624	4.252	5.332
PN: Expedient					177	1420	3.607	3.686					553	1624	3.781	3.792
PN: Conforming					178	1420	3.533	3.073					554	1624	3.205	2.858
PN: Conscientious					179	1420	3.215	2.904					555	1624	3.338	3.894
PN: Rational Altruistic					180	1420	4.104	4.316					556	1624	3.879	5.163

200

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
PN: Gets By					343	1250							536	870		
PN: Enjoys Everything					345	1250										
PN: Desires Approval					184	1420										
PN: Self-Confident					347	1250										
PN: Shows Initiative					349	1250							531	870	2.249	5.711
PN: Lacks Initiative					351	1250							535	870		
PN: Dislikes School					353	1250							534	870		
PN: Likes School					189	1420										
PN: Fears Failure					357	1250										
PN: Values Learning					355	1250							527	870		
PN: Works Effectively					359	1250							517	870		
PN: Seeks Recognition					363	1250										
PN: Overcomes Difficulty					363	1250	7.716	12.290							4.764	7.458
PN: Achieved Results					365	1250										
PN: Enjoys Work					366	1250										
English Grade					393	1248			797	941			805	789		
Math Grade					394	1245			798	798			806	444		
Social Science Grade					395	1059			799	403			807	577		
Science Grade					393	983			800	773			808	286		
PN: Unfriendly													543	870		
PN: Easily Upset (Irritable)													540	870		
PN: Most Ideas													651	870		
PN: Unusual Ideas													652	870		
PN: New Way of Meeting Problems													653	870		
PN: New Ideas													654	870		

	Grade VII				Grade IX				Grade X				Grade XII			
	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.	MFN	N	Mean	S.D.
PN: Reactive Passivity													655	870		
PN: Most Effective Leader													656	870		
PN: Prettiest Girl													657	870		
PN: Most Popular With the Girls													658	870		
Post Graduation Information													600	870		
Competitive Pre-Occupation Scale													607	883	3.293	1.462
Social Acceptance Pre-Occupation Scale													608	931	4.990	1.674
Strodtbeck's Modified V-Scale													609	889	3.719	2.277
Independence from Parents													610	933	11.340	2.569
Character or Super Ego Strength vs. Lack of Rigid Internal Standards													620	949		
Premsia vs. Harria													621	849		
Senior Attitude Inventory (SAI)*													649	870		
Bown Self-Report Inventory (SRI)													775	809		
Teachers' Senior Attitude Inventory													633	870		
Teacher Nominations for Talent Criteria													665	870		
Teacher Questionnaire (from Coleman's Adolescent Society)																
Teacher Biographical Information																
Students General Information (from Coleman's Adolescent Society)																
*Fables																
de Charms SAI													815		35.003	6.128
Edwards Social Desirability SAI													816		41.275	6.126
" Dogmatism Scale SAI													814		141.265	18.300
" Balanced F Scale SAI													817		71.759	8.135

**Footnote: c = constant, s = stanine.

TABLE A.23

Intercorrelations Among Values of HTRP Variables For Administration in Grades VII, IX, and XII. (Using forms and MFN's as shown in Table 4.2)

		Pearson Product--Moment Correlation (T)		
No. of Subjects in HTRP for Paircor Program		629	625	595
No.	Variable	VII&IX	VII&XII	IX&XII
1	CTMM	.642	.341	.482
2	STEP Listening	.677	.314	.458
3	Gestalt Transformation	.594	.152	.300
4	DAT Abstract Reasoning			.178
5	Unusual Uses	.472		
6	Short Words	.558	.282	.279
7	Consequences	.422		
8	Rhymes		.032	
9	Common Situations	.491	.152	.256
10	Seeing Problems	.472		
11	Mutilated Words	.592		
12	JPQ I Emotional Sensitivity	.367		
13	JPQ III Ego Strength		-.024	
14	JPQ VI Cyclothymia vs. Schizothymia		.039	
15	JPQ IX Independent Dominance		.090	
16	JPQ XI Surgency vs. Desurgency	.465	.085	.088
17	SSHA Scholastic Motivation	.539		
18	CYS McCandless Anxiety	.554	.326	.282
19	CYS Authoritarian Discipline	.439	.102	.054
20	CYS Criticism of Youth	.298	.172	.071
21	CYS Orientation to Society		.124	
22	CYS Negative Social Orientation	.412		.071
23	CYS Personal Maladjustment	.318	.151	.132
24	CYS Social Inadequacy	.347	.130	.113
25	Index of Social Status	.999	-.029	.215
26	PN: Brain	.607	.045	.735
27	PN: Quiet Ones	.518	.106	.521
28	PN: Left Out	.392	.030	.409
29	PN: Behavior Model	.520	.452	.558
30	PN: Negative Behavior Model	.400	.075	.478
31	PN: Academic Model	.574	.373	.678
32	PN: Negative Academic Model	.512	.284	.315
33	PN: Active	.476	.291	.569
34	PN: Avoids Trouble (Passive)	.193	.175	.222
35	PN: Imaginative	.386	.001	.615
36	PN: Wheels		.045	
37	PN: Wild Ones		-.016	
38	PN: Daydreamers		-.062	
39	PN: Impulsive		.266	
40	PN: Affective Neutrality		.417	

APPENDIX A

Section V

ANALYSIS OF DATA

Beginning with Table A.24, the tables in Appendix A provide factor loadings from a component analysis of criterion measures during the twelfth-grade year (1962-63) and the partial regression weights (or beta modal values) employed to compute criterion factor scores for each subject (Table A.25). The computer used these scores to calculate the intercorrelations among twelfth grade criterion factors (Table A.26) which turn out to be relatively independent of one another. The criterion factors turn out to be representatons of talented behavior in senior high schools as discussed in "Dimensions and Criteria of Talented Behavior."

Tables A.27 (factor loadings), A.28 (beta weights), A.29 (predictor measures defining predictor factors), and A.30 (demonstrating relatively independent predictor factors) are devoted to a component analysis (Harris, 1963) of the seventh-grade predictor variables. The product-moment correlations between seventh-grade "predictor factors" and twelfth-grade "criterion factors" appears as Table A.36 in this section. Notice that the most substantial relations are between seventh grade Convergent Thinking and twelfth-grade Academic Performance (.62), both the predictor and criterion variables emphasizing an ability to give appropriate responses. Moreover, there are correlations between twelfth-grade Peer Evaluated Creative Effectiveness, a talent attributed by one's age-mates, and antecedent seventh-grade Age-Mate Acceptance (.30), Peer Stimulus Value (.24), and Peer Visibility (.38). Other than the correlation between seventh-grade Age-Mate Acceptance and twelfth-grade Reputed Brain (.22), however, seventh-grade predictor factor variables have little or no relationship to the criteria of talent identified as "factors in persons" during the year of high school graduation.

Ninth-grade predictor factor variables are identified in Tables A.31 and A.32, pp. A-119 and A-120, with major components of each of the nine factors recorded in Table A.33 pp. A-121 and A-122. Relative independence of the ninth-grade predictors is demonstrated by their intercorrelations in Table A.34 p. A-123. Then the correlations between the fifteen seventh-grade factor scores and the nine ninth-grade factor scores for 629 HTRP subjects who had factor scores for both years appear in Table A.35 p. A-124. The most stable predictor factors over "The Years of Transformation" (Grades VII to IX) appear to be Convergent Think-

TABLE A.24

Varimax Factor Pattern for 87 Criterion Measures of Talented Behavior
Characterizing High School Seniors in Four Texas Communities (N ≥ 961)
(Entries rounded, no decimal points; "**" designates highest loading in raw, "*" other major loadings)

No.	Criterion Measures	MFN	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	h^2
1	T-NOM Intellectual Ability	666	326*	108	024	072	250*	055	-059	-013	-013	-041	686**	024	003	168	063	698
2	T-NOM Scientific Talent	667	033	022	-034	048	035	-010	059	021	-007	-008	701**	038	134	242	116	594
3	T-NOM Mathematical Ability	668	086	036	064	-081	022	032	162	010	-030	-021	811**	-019	048	281*	-024	789
4	T-NOM Language Ability	669	067	131	174	310*	313*	-015	-317*	-016	106	038	257*	-022	-238	361**	-247*	674
5	T-NOM Social Sciences	670	302*	165	086	054	300*	078	-011	-064	-051	122	169	109	-040	321*	-505**	647
6	T-NOM Foreign Languages	671	095	138	085	138	041	-009	-226	-171	-060	069	262*	070	-119	268*	-477**	532
7	T-NOM Artistic Ability	672	-012	097	-023	-021	189	067	-021	-607**	-064	033	006	165	003	364*	-219	632
8	T-NOM Musical Ability	673	097	013	063	100	175	779**	-036	-039	-037	006	-005	-086	023	061	-008	677
9	T-NOM Interpretive Arts	674	198	161	-065	202	062	104	-054	044	270*	038	113	193	-126	-148	358**	420
10	T-NOM Mechanical Arts	675	122	044	019	114	011	-046	-047	082	-082	122	048	023	734**	044	047	609
11	T-NOM Dramatic Talent	676	-018	134	060	358*	033	020	-236	-048	136	-050	-002	-002	-102	674**	105	707
12	T-NOM Athletic Talent	677	013	103	049	-025	176	031	143	017	-044	785**	010	-044	051	069	-017	695
13	T-NOM Effective Leader	678	066	740**	-020	-026	380*	086	091	023	-088	057	134	002	102	323*	-002	858
14	T-NOM College Success	679	342*	235	098	000	524*	067	-010	-047	-054	056	559**	-023	022	194	-074	826
15	T-NOM Professional Contrib'n	680	201	258*	100	070	321*	108	078	-070	-086	150	388*	011	019	551**	-159	757
16	T-NOM Political Success	681	-065	266*	039	030	028	083	122	021	076	-045	083	027	074	746**	-070	683
17	T-NOM High Perseverance	682	295*	224	076	054	585**	139	-038	-048	-012	027	214	-001	022	167	-215	633
18	T-NOM Tangible Objects	683	-014	-019	-038	114	317*	-075	-029	-057	035	-089	161	-009	569**	004	-118	498
19	T-NOM Assigned Tasks	684	297*	180	079	109	555**	048	-033	-071	-085	050	424*	-018	015	191	-173	711
20	T-NOM Empathic Sensitivity	685	055	491*	017	032	395*	055	-030	-002	-027	088	241	-083	042	437**	167	700
21	T-NOM Power behind Scenes	686	-151	286*	080	012	481**	-001	104	135	008	054	119	-108	222	230	-073	508
22	T-NOM Effective Organizer	687	103	514**	-023	-063	421*	111	154	034	-061	061	014	-104	129	422*	046	709
23	T-NOM Social Poise	688	175	340*	022	-008	686**	067	-026	-070	053	-005	072	025	007	236	130	709
24	T-NOM Core of Problem	689	243	202	174	071	307*	126	075	-007	042	103	263*	-042	-006	564**	-114	665
25	T-NOM Interpersonal Perception	690	099	214	-037	-032	508*	115	149	-083	-051	149	189	-100	014	560**	142	763
26	T-NOM Self Insight	691	138	209	112	-061	556**	058	078	-142	002	041	226	009	-022	370*	-051	610
27	T-NOM Tactful Social Skills	692	021	336*	072	-002	700**	082	036	-052	004	197	008	-066	-007	110	148	695
28	T-NOM Operate Independently	693	327*	183	129	114	077	-034	011	-120	-018	060	365*	018	000	468**	002	548
29	T-NOM Writes with Appeal	694	-031	016	155	461**	083	-039	-325*	046	116	038	081	003	-186	442*	-227	657
30	T-NOM Potential Scholar	695	112	105	085	-014	116	087	105	-103	-087	026	565**	052	052	542*	-170	729
31	T-NOM Synthesizing Ability	696	107	144	040	092	118	078	-046	013	-017	-064	355*	036	086	677**	-023	662
32	T-NOM Thinks Divergently	697	152	151	134	-015	169	114	030	-168	128	-152	312*	130	110	481**	-035	533
33	T-NOM Meaningfully Structures Ideas	698	578**	045	167	055	252*	016	048	024	040	005	342*	-051	029	235	-086	618
34	T-NOM Perceptive re Problems	699	548**	223	032	-056	167	083	101	-041	-022	-044	383*	-024	-048	413*	051	726
35	T-NOM Resourceful Use of Objects	700	-171	026	230	086	396**	180	-032	-062	103	-227	-002	128	109	013	-077	381
36	T-NOM Copes with Environment	701	441**	026	169	-017	114	063	-134	066	137	009	067	-029	098	061	014	301
37	T-NOM Victim of Circumstances	702	-014	051	-042	083	-045	065	114	123	293*	020	-039	-089	070	-039	-433**	336
38	T-NOM Original, Fluent Expression	703	238	372*	084	176	288*	120	-026	050	017	-015	214	010	-026	533**	-056	668
39	T-NOM Extensive Reading	704	157	087	113	258*	156	023	-096	-114	014	-040	253*	066	031	629**	-206	667
40	T-NOM Self Disciplines	705	194	190	115	-071	472**	-028	-032	-074	-106	107	441*	-051	032	054	-106	558
41	T-NOM Problem-Solving Skill	706	376*	187	071	-032	167	216	126	-079	-074	105	386*	041	083	522**	-146	747
42	T-NOM Truly Creative	707	333*	195	117	011	318*	185	021	-443**	-006	-184	013	146	067	291*	-126	656
43	P-NOM Ideational Fluency	651	140	899**	052	036	064	033	017	-067	008	-091	124	-006	029	194	-018	905
44	P-NOM Unusual Ideas	652	096	730**	164	053	-012	021	079	-218	255*	-131	060	-036	039	230	-066	772
45	P-NOM Fresh Problem Sol'ns	653	067	723**	145	055	101	059	018	-010	-022	015	544*	012	058	229	-014	917
46	P-NOM Develops New Ideas	654	034	265*	256*	-057	-077	-014	133	-188	139	-030	561**	-010	084	359*	000	670
47	P-NOM Forsees Consequences	655	024	686**	169	065	092	058	010	-030	-058	007	515*	009	058	284*	-036	874
48	P-NOM Effective Leader	656	-015	888**	009	-026	102	013	098	036	-105	142	084	-009	058	093	-066	866
49	P-NOM Wheel	659	024	842**	018	-023	172	023	122	032	054	238	042	-044	-012	165	-039	848
50	P-NOM Wild One	660	052	083	-043	-006	-012	-018	149	010	693**	-006	-046	005	021	-049	-041	521
51	P-NOM Average One	661	-066	083	284*	192	182	-006	026	-003	022	006	086	127	-008	-076	056	195
52	P-NOM Daydreamer	545	-055	-024	-033	010	-038	003	110	-087	566**	-027	-016	-032	-098	050	034	361
53	P-NOM Artistic Ability	546	019	106	082	-026	018	-005	-069	-764**	110	-001	037	-109	020	031	089	643
54	P-NOM Athletic Ability	547	-022	162	064	-039	013	020	034	-041	077	776**	046	019	070	-033	-039	659
55	P-NOM Math Ability	548	-009	252*	208	-024	113	004	-010	054	019	024	840**	-033	-003	056	-084	842
56	P-NOM Science Ability	549	019	185	266*	032	019	006	011	-004	042	062	780**	-073	003	206	-009	769
57	P-NOM Mechanical Ability	550	-045	015	060	-095	-160	027	-132	-167	377*	178	029	-051	407**	113	040	444
58	P-NOM Musical Ability	551	143	152	012	148	046	769**	-126	-037	107	031	072	048	-092	-045	165	733
59	P-NOM Works Effectively	517	030	682**	182	120	148	071	-129	023	051	082	527*	028	-044	116	-066	866
60	P-NOM Brain...Bookish	518	-017	407*	207	045	139	048	-174	004	023	-020	752**	015	-026	083	-087	844
61	P-NOM Avoids Failure	519	-002	612**	246	088	266*	054	-174	004	040	056	526*	021	-082	-048	-048	839
62	P-NOM Academic Model	520	-072	578**	272*	093	265*	029	-094	-034	000	070	514*	060	-036	-044	-008	779
63	P-NOM Nonacademic Model	521	111	147	-081	-003	079	017	-042	062	650**	013	041	-026	052	057	-054	487
64	P-NOM Creative Imagination	522	032	752**	199	162	157	049	-019	-198	261*	-030	086	-012	-059	159	-003	805
65	P-NOM Potential Talents	523	134	404**	178	135	060	351*	-198	-285*	224	214	248*	045	-170	103	017	677
66	P-NOM Verbal Facility	524	072	620**	153	200	096	129	-142	-003	086	-012	245	021	-118	424*	-139	780
67	P-NOM Values Learning	527	-003	763**	127	142	280*	053	-102	-034	191	081	165	030	-052	-070	061	793
68	STEP Science (2A)	603	026	061	809**	-009	020	013	068	-072	-016	074	136	014	090	173	-010	735
69	STEP Social Studies	605	095	150	846**	037	064	015	003	-045	-063	006	124	-033	-005	079	-059	785
70	STEP Mathematics	606	074	124	791**	-009	-023	058	074	022	022	052	206	-043	050	110	-025	719
71	Coop SCAT (V + Q)	809	092	164	829**	044	062	055	048	-019	-055	-005	132	021	-057	074	-015	764
72	NMS Won Speech Contest(s)	633	082	131	080	630**	-023	177	083	-198	-042	-056	-056	-063	048	148	-050	544
73	NMS Publication(s)	634	004	-029	024	581**	054	-047	017	014	-029	-008	104	-071	156	107	-079	404
74	NMS Won Prize(s) in Art	635	-135	-027	001	172	102	-012	244	-574**	-027	035	012	-147	-067	-039	010	478
75	NMS State Music Contest	636	-017	051	046	008	101	648**	014	-002	-022	015	-015	-108	-053	198	014	490
76	NMS National Music Contest	637	-063	055	-008	-095	-045	654**	100	060	-005	-037	113	057	026	178	-256*	574
77	NMS Composed and Performed Music	638	021	005	-092	109	-029	-003	029	-130	027	-063	018	-700**	036	-055	-099	549
78	NMS Arrange Music for Performance	639	-011	044	046	-054	133	124	-009	-014	077	088	006	-763**	-058	017	072	646
79	NMS Minor Role in Plays	640	-088	082	057	245	-027	198	301*	-022	042	-230	044	-129	049	-081	-076	297
80	NMS Lead in HS or Church Play	641	-049	101	064	344**	014	138	150	-026	176	-202	-013	-042	-027	031	062	256
81	NMS Creative Writing	642	-008	154	-020	552**	-059	015	233	-040	-063	065	-052	065	019	232	056	460
82	NMS Published Cartoon	643	050	005	-045	160	-098	-026	042	-370**	-037	-005	001	-319*	049	-072	021	779
83	NMS Original Scientific Paper	644	-269*	162	-076	085	110	128	144	022	-045	213	363*	-077	008	605**	062	487
84	NMS Scientific Talent Award	645	-023	047	081	090	079	-029	596**	013	112	095	076	-050	-112	121	-087	805
85	NMS Made Scientific Apparatus	646	133	-002	258*	217	031	-047	506**	-040	117	158	-008	-051	044	-053	042	677
86	NMS Invented Patentable Device	647	-118	-020	-031	026	-009	-035	262*	-141	115	011	019	135	-068	038	057	780
87	GPA-12 Grade Point Average	811	120	134	539*	091	241	041	-046	042	-192	-036	198*	092	-112	-029	005	793

TABLE A.25

Regression Weights for 87 Criterion Measures of Talented Behavior
Characterizing High School Seniors in Four Texas Communities (N ≤ 961)
(Entries rounded, no decimal points; "" = highest weight in a row, "*" = other major weights)**

No.	Criterion Measures	MPN	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
1	T-NOM Intellectual Ability	666	098	-017	-087	032	0	-006	0	0	0	-029	119**	003	-008	-046	077
2	T-NOM Scientific Talent	667	-029	-071	-036	040	-010	0	017	0	006	0	168**	040	059	007	130*
3	T-NOM Mathematical Ability	668	-016	-041	-034	-041	-044	008	108*	0	0	-022	176**	-012	0	0	0
4	T-NOM Language Ability	669	-037	-043	014	097	089	-079	-168*	035	052	025	0	-037	-168**	028	-102*
5	T-NOM Social Sciences	670	117*	0	-011	-004	010	0	018	0	-007	045	-019	058	-034	-021	-334**
6	T-NOM Foreign Languages	671	-009	0	-028	029	-030	-016	-104*	-074	-034	065	011	029	-057	0	-283**
7	T-NOM Artistic Ability	672	-089	-004	-036	-063	022	004	-013	-300**	-049	023	-023	140*	0	040	-112*
8	T-NOM Musical Ability	673	0	-038	004	022	012	329**	-022	009	-039	014	-008	-037	052	-030	005
9	T-NOM Interpretive Arts	674	131*	0	-046	134*	005	019	0	020	111*	046	044	152*	-076	-065	264**
10	T-NOM Mechanical Arts	675	073	014	007	106*	-050	008	-096	032	-043	067	-017	027	512**	-017	054
11	T-NOM Dramatic Talent	676	-072	-016	030	102*	-023	-039	-161*	016	048	0	-053	-020	-041	198**	169*
12	T-NOM Athletic Talent	677	0	-023	0	028	013	007	033	-008	-004	433**	-007	019	005	0	-005
13	T-NOM Effective Leader	678	0	092**	-048	-016	006	0	018	027	-086	-013	-081	0	035	013	005
14	T-NOM College Success	679	068	-020	-014	-005	111**	-004	0	0	0	0	063	0	0	-039	0
15	T-NOM Professional Contrib'n	680	013	0	0	0	0	004	060**	0	-036	042	0	004	0	042	-037
16	T-NOM Political Success	681	-092	005	008	-050	-025	0	027	047	030	-034	-068	006	022	211**	0
17	T-NOM High Perseverance	682	083	-015	-032	004	150**	012	0	005	009	-010	-014	0	0	-054	-129*
18	T-NOM Tangible Objects	683	-081	-029	-018	074	116*	-020	-044	-026	034	-063	027	022	379**	-062	-081
19	T-NOM Assigned Tasks	684	064	-042	-030	039	126**	-016	005	-017	-022	0	030	-007	-020	-072	-066
20	T-NOM Empathic Sensitivity	685	-034	028	-009	-024	044	-014	-030	023	-013	0	-008	-065	007	067	156**
21	T-NOM Power behind Scenes	686	-187**	0	016	-022	168*	-016	044	102*	022	-032	-025	-054	125*	015	-042
22	T-NOM Effective Organizer	687	0	062	-006	-086**	059	005	069	047	-035	-029	-066	-048	050	067	037
23	T-NOM Social Poise	688	0	-014	-004	-020	194**	-019	-017	-006	039	-035	-027	014	0	0	113*
24	T-NOM Core of Problem	689	039	-021	022	-013	012	0	026	040	022	025	-016	-030	-018	096**	-011
25	T-NOM Interpersonal Percept'n	690	-027	-046	-014	-035	098	0	033	-008	-006	034	-006	-049	-026	117*	162**
26	T-NOM Self Insight	691	-044	-027	0	-070	144**	-030	036	-033	014	-014	-006	012	-045	029	0
27	T-NOM Tactful Social Skills	692	-073	-010	005	0	245**	-013	0	0	006	058	-059	-008	-049	-015	126*
28	T-NOM Operate Independently	693	156**	0	0	022	-079	-056	0	-027	-023	027	0	0	-016	057	066
29	T-NOM Writes with Appeal	694	-077	-057	039	186*	015	-047	-191**	061	064	057	-018	-040	-085	101*	-096
30	T-NOM Potential Scholar	695	-026	-050	-022	-028	-013	004	043	-024	-032	0	077	034	0	080**	-047
31	T-NOM Synthesizing Ability	696	-013	-017	-005	0	-032	0	-038	036	0	-055	007	0	032	134**	045
32	T-NOM Thinks Divergently	697	0	-018	016	-065	0	013	015	-049	070	-110**	005	087	057	066	025
33	T-NOM Meaningfully Structures Ideas	698	311**	-038	005	021	-022	-037	029	045	022	0	0	-042	-005	-013	-008
34	T-NOM Perceptive re Problems	699	262**	012	-028	-041	-049	-005	056	008	-023	-027	021	-035	-056	032	077
35	T-NOM Resourceful Use of Objects	700	-205**	-048	077	009	186*	065	-016	-020	084	-140*	-008	095	092	-032	-051
36	T-NOM Copes with Environment	701	246**	-014	044	-014	-022	0	-088	059	066	006	-046	-043	071	-005	047
37	T-NOM Victim of Circumstances	702	-007	011	-028	015	-012	027	082	094	145*	0	-005	-046	040	-048	-339**
38	T-NOM Original, Fluent Expression	703	058	015	-011	034	006	0	0	085**	-007	-019	-038	-007	-024	065	012
39	T-NOM Extensive Reading	704	0	-029	0	060	-014	-032	-044	[illegible]	0	-007	-005	020	006	090**	-058
40	T-NOM Self Disciplined	705	029	-032	-007	-024	101**	-040	-014	-026	-032	017	052	-033	0	-068	-054
41	T-NOM Problem-Solving Skill	706	129**	0	-030	-068	-083	066	088	0	-056	025	007	025	026	036	-047
42	T-NOM Truly Creative	707	121*	007	005	-042	039	032	011	-195**	-011	-098	-062	096	042	0	-058
43	P-NOM Ideational Fluency	651	069	218**	-003	0	-036	-066	0	0	-031	-045	-032	0	0	0	0
44	P-NOM Unusual Ideas	652	047	102*	006	-058	-113*	-027	028	-054	048	-134**	-080	-023	047	0	-029
45	P-NOM Fresh Problem Sol'ns	653	0	056	-082**	0	-024	0	0	004	-027	0	015	0	013	0	0
46	P-NOM Develops New Ideas	654	-045	008	048	-082	-088	-011	079	-078	048	-028	091**	0	044	037	034
47	P-NOM Foresees Consequences	655	0	081	0	0	-133**	0	0	0	-042	-033	073	0	026	-005	0
48	P-NOM Effective Leader	656	0	223**	-030	-056	-056	0	083	028	-129*	005	-012	0	048	-025	-079
49	P-NOM Wheel	659	017	091**	-018	-007	-047	-010	026	029	0	063	-078	-015	-013	0	-040
50	P-NOM Wild One	660	031	-005	-010	-035	037	-025	097	036	339**	0	0	025	-004	-018	-055
51	P-NOM Average One	661	-073	-019	073	104**	088	-015	024	0	013	0	013	098	0	-051	053
52	P-NOM Daydreamer	545	-048	-046	-005	-033	031	-020	053	-020	285**	-014	019	0	-077	027	013
53	P-NOM Artistic Ability	546	-010	-008	013	-054	-008	-020	-073	-386**	020	008	005	-039	024	-016	097
54	P-NOM Athletic Ability	547	0	0	0	006	-043	018	-016	-033	031	433**	0	049	032	-035	-041
55	P-NOM Math Ability	548	-130*	0	0	-021	0	0	014	027	018	-006	195**	-009	-010	-097	-022
56	P-NOM Science Ability	549	-044	-034	021	0	-038	-008	0	0	027	016	142**	-051	-030	0	016
57	P-NOM Mechanical Ability	550	-038	-026	045	-078	-078	025	-153*	-087	185*	111*	0	-023	299**	050	045
58	P-NOM Musical Ability	551	054	0	-021	053	-029	329**	-063	-003	011	040	026	054	0	-072	127*
59	P-NOM Works Effectively	517	-019	103**	0	069	0	0	-037	028	0	0	043	004	-004	-043	0
60	P-NOM Brain...Bookish	518	-067	0	012	0	0	020	-107*	0	0	-006	151**	0	-008	-029	-036
61	P-NOM Avoids Failure	519	-087	037	016	0	016	0	-070	0	0	-022	061	0	-037	-098**	-016
62	P-NOM Academic Model	520	-105**	049	012	027	050	0	-039	0	-004	008	076	040	-009	-076	0
63	P-NOM Nonacademic Model	521	037	-009	-024	-033	028	-011	-034	063	326**	0	0	-010	035	0	-044
64	P-NOM Creative Imagination	522	0	126**	021	013	0	-018	0	-051	096	-015	-022	0	-027	0	0
65	P-NOM Potential Talents	523	031	005	0	039	-069	105*	-131*	-122*	082	139**	014	035	-093	-030	036
66	P-NOM Verbal Facility	524	0	068	0	014	-070**	0	-058	036	0	-016	-022	0	-062	032	-042
67	P-NOM Values Learning	527	-018	089	0	039	032	-005	-036	0	052	004	0	035	-014	-092**	026
68	STEP Science (2A)	603	-024	-039	249**	-066	-042	0	008	0	0	016	-054	0	068	055	039
69	STEP Social Studies	605	0	0	261**	-028	-013	-017	-005	0	-025	-005	-042	-041	004	0	0
70	STEP Mathematics	606	0	-017	243**	-042	-038	004	010	027	014	010	-022	-051	028	031	012
71	Coop SCAT (V + Q)	809	014	-006	246**	-033	-008	0	029	033	-024	-020	-066	0	-020	004	031
72	NMS Won Speech Contest(s)	633	064	009	-019	301**	-056	044	043	-055	-085	-010	-031	-007	053	-039	0
73	NMS Publication(s)	634	0	-029	-031	307**	011	-041	003	034	-040	019	022	-025	113*	-038	-020
74	NMS Won prize(s) in Art	635	-100*	-031	-019	072	050	-016	132*	-285**	-035	024	041	-040	-058	-053	005
75	NMS State Music Contest	636	-056	-023	011	-035	-006	268**	-004	023	-022	0	-015	-055	-020	028	022
76	NMS Natl. Music Contest	637	-088	0	-013	-088	-049	304**	072	042	-004	-033	015	049	038	0	-188*
77	NMS Comp'sd & Performed Music	638	034	011	-030	028	-022	-016	-028	-024	-014	-056	011	0459**	008	-020	-086
78	NMS Arr. Music for Performance	639	-006	-012	036	-056	023	019	-073	033	032	010	-011	-512**	-062	027	040
79	NMS Minor role in plays	640	-046	015	0	106*	0	088	182**	018	-007	-144*	033	-056	036	-068	-076
80	NMS Lead in HS or Church Play	641	-029	0	006	151**	016	040	096	017	058	-107*	0	-008	-013	-021	046
81	NMS Creative Writing	642	023	020	-040	284**	-044	-016	134*	005	-077	062	-021	011	009	018	073
82	NMS Published Cartoon	643	057	016	-033	073	-060	-024	-006	-174*	-061	004	018	-190**	038	-043	014
83	NMS Orig. Scientific Paper	644	-247**	-035	-049	0	0	031	031	034	-005	088	055	-025	-020	136*	073
84	NMS Scientific Talent Award	645	-017	-019	0	034	032	-029	358**	042	051	018	011	014	-138*	-008	-075
85	NMS Made Scientific Apparatus	646	093	-021	059	121*	0	-040	285**	007	044	071	-004	019	-004	-062	021
86	NMS Invented Patentable Device	647	-072	-022	-013	013	025	-011	157**	-075	056	006	034	123*	-063	004	041
87	GPA-12 Grade Point Average	811	018	-013	142**	032	051	0	-009	027	-087	-028	-006	038	-065	-038	030

TABLE A.26

INTERCORRELATION OF TWELFTH GRADE CRITERION FACTOR VARIABLES

No.	Variable	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
25	Teacher Evaluated Productive Thinking (I)	1.0	09	-03	10	05	03	-10	02	10	-02	-15	02	-09	05	07
26	Peer Evaluated Creative Effectiveness (II)		1.0	01	-02	-01	02	07	00	01	02	10	02	00	11	00
27	Academic Performance (III)			1.0	-04	-01	04	-02	00	03	-01	01	-02	-02	-05	-04
28	Rhetorical Ability (IV)				1.0	02	02	04	15	01	-04	03	07	-03	-26	-09
29	Teacher Evaluated Social Poise (V)					1.0	00	00	-04	-01	02	03	-06	01	10	02
30	Musical Ability (VI)						1.0	01	-02	-03	-01	02	-02	00	06	-01
31	Striving Scientist (VII)							1.0	04	01	02	-11	01	-03	20	03
32	Artistic Ability (VIII)								1.0	-01	03	05	-15	00	-02	-08
33	Potential Delinquent (IX)									1.0	00	-02	05	03	-07	-04
34	Athletic Ability (X)										1.0	00	-06	02	-01	-02
35	Reputed Brain (XI)											1.0	00	03	-10	01
36	Recognized Strainer (XII)												1.0	04	-04	01
37	Mechanical Aptitude (XIII)													1.0	10	01
38	Potential Politician (XIV)														1.0	-10
39	Interpretive Sensitivity (XV)															1.0

TABLE A.27

Varimax Factor Structure of 57 Dimensional Variables (Predictors)
Measured in Seventh-Grade Year at Four Community Locations
of the Human Talent Research Program (N = 1570)

(Entries rounded, no decimal points; "**" designates highest loading in row, "*" other major loadings)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	h^2
1	CTMM Mental Function	1	128	-098	700**	-035	-060	069	-251*	-007	-049	099	-165	040	030	-027	025	6
2	STEP Listening	13	122	-074	614**	-081	-134	174	-133	012	053	144	-203	048	140	010	117	5
3	Gestalt Transformation	16	101	-054	679**	033	008	-003	-015	-070	-026	026	-052	024	-064	003	019	490
4	DAT Mechanical Reasoning	143	048	-101	731**	-022	117	-152	100	019	140	006	-050	-083	089	147	050	656
5	DAT Space Relations	161	019	-065	672**	-074	-054	-098	023	060	063	102	051	041	-063	212	054	5
6	DAT Clerical Speed & Accuracy	142	141	-025	229	-110	-141	038	-331*	-062	-061	084	-235	030	079	451**	048	4
7	GFT Rhymes	21	153	-020	602**	052	-108	121	-360*	055	-108	070	-191	024	-092	-070	051	6
8	GFT Unusual Uses	22	128	008	605**	019	-032	038	-126	026	-048	-023	-266*	-121	-058	-074	044	501
9	GFT Consequences	24	115	-066	264*	017	-044	062	-077	013	-003	018	-757**	-024	-040	043	-033	6
10	GFT Common Situations	23	060	-068	150	-001	-046	017	-058	-033	025	083	-798**	-009	046	139	-002	7
11	GFT Seeing Problems	20	041	-048	302*	-002	-065	013	-163	080	-099	088	-686**	-017	-019	081	076	6
12	Gestalt Completion	17	011	-040	465**	-032	003	022	-284*	022	-007	034	-199	-090	119	365*	067	501
13	KRT Mutilated Words	18	140	-025	318*	-069	-054	084	-627**	058	-115	088	-179	026	029	167	-009	6
14	KRT Short Words	14	132	022	238	-057	-067	081	-652**	018	-100	135	-130	048	-059	078	-002	5
15	PMT Dotting Test	58	169	016	182	-157	-077	014	-145	099	-104	107	-263*	-026	-001	505**	131	4
16	DRT Discrimination	61	093	-074	408**	-008	041	047	-107	-112	101	111	-181	026	038	369*	068	407
17	JPQ-1 Emot'l Sensitivity	39	-043	270*	-169	-071	-415**	197	-038	058	-168	-033	067	168	-067	056	-047	396
18	JPQ-3 Neurotic vs. Ego Strength	41	-105	466**	-165	035	465*	116	146	-009	-097	-053	004	121	040	-033	-067	5
19	JPQ-6 Cyclo vs. Schizothymia	44	038	-078	089	027	-523**	-036	-008	-035	-030	036	-102	-109	-023	-002	024	3
20	JPQ-4 Will Control vs. Relaxed	42	002	-063	-134	-051	-611**	-418	-075	-002	-090	-019	048	074	-051	055	-076	605
21	JPQ-9 Independent Dominance	47	011	163	166	073	601**	020	257*	-036	-119	-032	-038	-057	061	-099	-122	537
22	JPQ-10 Energetic Conformity	48	064	-282*	092	-072	-035	583**	-066	055	032	052	001	-077	-051	094	060	4
23	JPQ-11 Surgency vs. Desurgency	49	001	088	-073	039	126	769**	-093	015	036	089	-082	-043	092	-007	124	6
24	SSHA Scholastic Motivation	51	166	-246	262*	-197	-581**	014	006	034	-123	089	-158	044	104	-070	-024	600
25	CYS CMAS Anxiety	25	-081	677**	-125	024	267*	010	006	062	-075	-062	045	012	-005	039	-349*	692
26	CYS Authoritarian Discipline	29	-015	056	-146	-044	-044	-149	082	-025	-069	-040	030	033	-020	-083	-729**	6
27	CYS Critic of Education	26	-225	154	-185	102	439**	031	-169	018	120	-041	172	-098	-179	258*	-172	5
28	CYS Critic of Youth	27	037	153	-010	-028	-026	025	-042	004	-063	012	-041	004	064	-077	-769**	636
29	CYS Neg. Soc. Orient'n.	30	-054	193	-198	079	310*	-133	-031	003	041	-046	086	-099	-091	122	-586**	588
30	CYS Personal Maladjustment	32	-034	813**	-064	124	090	-038	002	-022	-020	-034	029	-078	009	-094	-021	7
31	CYS Social Inadequacy	34	-005	814**	-060	-024	-014	-077	-038	-050	032	-016	041	049	034	-048	-011	6
32	CYS Self Inadequacy	31	-109	612**	-088	016	318*	-048	014	029	072	-056	110	011	-068	129	-231	5
33	CNN Need Achievement	170	066	-096	-038	004	019	-225	-167	-021	-772**	036	-039	-115	030	-108	-111	731
34	CNN Need Aggression	171	-025	133	-042	029	521**	-176	-237	045	105	008	-048	-080	169	-399*	086	5
35	CNN Aggressive Anxiety	168	005	155	-013	-074	-246	131	-034	-014	-704**	055	-022	139	012	206	-037	6
36	Family Social Status (Signs Reversed)	62	145	-150	474**	-117	081	-008	281*	235	-306*	158	-232	-041	-129	016	267*	6
37	NOM Wheel	70	598**	-049	079	141	-021	013	-005	175	010	342*	-045	-321*	117	135	026	672
38	NOM Brain	71	659**	-012	318*	-048	-107	-069	-019	101	014	232	-061	120	038	-013	-000	6
39	NOM Quiet One	75	060	036	-042	042	-022	-105	-062	-030	006	-022	032	784**	-064	-104	016	6
40	NOM Wild One	76	215	-015	-097	643**	138	032	-014	-053	069	-103	-040	-287*	-126	113	-002	6
41	NOM Left Out	77	-185	108	-006	686**	-045	-034	011	108	-029	020	030	225	082	-153	-008	614
42	NOM Behavior Model	89	363*	-034	042	-078	001	056	-038	818**	-022	196	-054	-018	-055	066	020	864
43	NOM Neg. Behavior Model	90	-051	014	-006	429*	008	034	-031	816**	052	-013	-001	-024	056	-072	002	8
44	NOM Academic Model	82	697**	-055	138	-066	-104	-022	-092	117	004	309*	-059	177	100	059	-028	6
45	NOM Neg. Academic Model	83	-149	008	-026	722**	041	-050	093	179	076	097	051	113	234	-063	033	679
46	NOM Active	85	659**	-052	139	125	-031	032	-039	174	-025	348*	-043	-155	100	159	054	692
47	NOM Passive (Avoidant)	86	308*	-115	151	442**	029	053	106	015	-002	167	-010	330*	145	205	010	5
48	NOM Impulsive	98	051	-018	-050	781**	101	-012	-027	072	016	057	-071	-069	124	-047	043	6
49	NOM Affective Neutrality	99	608**	-102	040	060	-056	005	-090	068	-074	373*	-048	260*	-022	058	-028	621
50	NOM Imaginative	72	635**	021	152	237	010	016	-052	-109	-083	026	-014	-134	-186	053	011	561
51	NOM Daydreamer	73	129	128	-016	663**	037	031	049	-096	-034	-051	056	-042	-297*	-048	-056	5
52	NOM Amoral	176	026	021	-021	108	081	051	013	-013	-029	-055	012	-065	809**	026	-010	6
53	NOM Expedient	177	124	-059	019	192	-042	004	-146	028	051	715**	-090	-278*	158	-019	017	70
54	NOM Conforming	178	207	-052	072	010	038	115	-063	023	-028	767**	-072	-062	-014	041	042	672
55	NOM Conscientious	179	269*	-018	186	-001	-051	-014	-008	021	-060	717**	-022	147	-113	013	012	6
56	NOM Rational Altruistic	180	314*	-027	111	-104	-101	060	-026	079	-057	740**	-040	141	-097	104	016	7
57	Age-Mate IPS	64	532**	-092	025	-260*	-043	108	-114	-060	026	-008	-134	037	-040	-083	021	4

TABLE A.28

Modal Values for 57 Dimensional Variables (Predictors)
Over 15 Factors for Students in Seventh-Grade Year in Four Community Locations
of the Human Talent Research Program (N = 1570)
(Entries rounded, no decimal points; "**" denotes highest modal value, "*" other significant values for the variable)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
1	CTMM Mental Function	1	-028	0	192**	004	0	051	-099	-022	-008	-005	069	026	012	-125*	-063
2	STEP Listening	13	-020	046	156**	-011	-052	117*	0	-015	064	012	010	027	101*	-082	-018
3	Gestalt Transformation	16	-008	006	231**	031	0	024	050	-058	-018	-020	091	009	-051	-057	-053
4	DAT Mechanical Reasoning	143	-026	0	237**	-005	034	-116*	126*	009	075	-014	082	-048	069	087	-030
5	DAT Space Relations	161	-082	012	228**	-006	-017	-070	080	045	042	025	156*	007	-043	136*	-027
6	DAT Clerical Speed & Accuracy	142	0	008	-035	0	-009	-031	-127*	-045	-006	-024	-029	022	083	304**	024
7	GFT Rhymes	21	-006	020	148*	047	-028	076	-184*	012	-044	-032	040	005	-088	-185**	-016
8	GFT Unusual Uses	22	007	057	161**	019	-027	027	-010	005	-011	-064	-036	-084	-068	-151*	-016
9	GFT Consequences	24	0	0	-052	020	0	008	072	-003	057	-029	-430**	023	-058	-045	-056
10	GFT Common Situations	23	-026	003	-117*	008	011	-043	091	-037	085	017	-483**	046	004	048	-025
11	GFT Seeing Problems	20	-063	015	-044	010	007	-056	0	036	-014	007	-357**	015	-048	-016	021
12	Gestalt Completion	17	-062	0	073	004	022	-038	-105*	008	0	-021	023	-047	099	235**	006
13	KRT Mutilated Words	18	-010	-020	005	0	040	0	-393**	032	-036	-038	054	023	014	018	-010
14	KRT Short Words	14	-016	-003	0	004	022	0	-432**	0	-028	005	057	036	-055	-058	005
15	PMT Dotting Test	58	0	044	-056	-035	013	-069	012	063	-048	-024	-074	-017	006	372**	093
16	DRT Discrimination	61	-029	-010	060	020	036	-009	015	-086	075	017	-010	034	028	250**	0
17	JPQ-1 Emot'l Sensitivity	39	-017	151*	-014	005	-217**	183*	016	048	-066	-022	035	057	-028	033	-010
18	JPQ-3 Neurotic vs. Ego Strength	41	006	116*	-013	-024	156**	080	098	-005	-112*	007	-064	113*	033	006	034
19	JPQ-6 Cyclo vs. Schizothymia	44	-019	066	026	050	-258**	0	042	-030	034	008	-022	-136*	-007	-024	-013
20	JPQ-4 Will Control vs. Relaxed	42	-009	036	-048	015	-234*	-270**	-057	015	013	0	011	-020	-016	069	0
21	JPQ-9 Independent Dominance	47	026	-015	094	-016	247**	030	186*	-036	-153*	-004	-033	007	045	-053	-054
22	JPQ-10 Energetic Conformity	48	-006	-115*	021	-004	-010	416**	004	024	0	-026	079	-024	-050	023	-083
23	JPQ-11 Surgency vs. Desurgency	49	-005	043	-028	009	-004	537**	-003	-032	004	009	-014	0	048	-063	0
24	SSHA Scholastic Motivation	51	0	0	063	-028	-233**	052	076	012	-012	-004	-022	-022	095	-121*	-096
25	CYS CMAS Anxiety	25	0	213**	023	-014	009	028	024	046	-028	0	-009	0	008	034	-103*
26	CYS Authoritarian Discipline	29	0	-078	030	-006	-040	0	066	006	005	008	-037	007	006	-048	-447**
27	CYS Critic of Education	26	-084	-048	-038	021	171*	-019	-164*	036	034	035	090	-027	-152*	244**	-053
28	CYS Critic of Youth	27	-005	-031	068	-012	-062	135*	020	009	027	015	-025	0	074	-092	-498**
29	CYS Neg. Soc. Orient'n.	30	-006	-056	-012	006	098	-054	-031	018	040	010	004	-040	-057	132*	-310**
30	CYS Personal Maladjustment	32	023	370**	041	015	-099	-015	017	-019	014	017	-018	-100*	012	-087	121*
31	CYS Social Inadequacy	34	052	382**	016	-032	-134	-058	0	-043	089	008	-013	-020	044	-048	113*
32	CYS Self Inadequacy	31	-004	195*	023	-024	052	-026	022	046	060	014	020	004	-035	136*	-049
33	CNN Need Achievement	170	0	-117*	-030	027	126*	-161*	-131*	-019	-585**	-006	035	-097	043	-088	010
34	CNN Need Aggression	171	034	-003	-036	-058	236*	-193*	-282*	017	035	028	-060	0	112*	-341**	117*
35	CNN Aggressive Anxiety	168	-046	056	-006	017	-043	114*	070	-017	-497**	-004	053	048	041	163*	020
36	Family Social Status(Signs Reversed)	62	-011	- 0	094	-061	104*	-023	299**	129*	-256*	024	-075	-023	-128*	010	126*
37	NOM Wheel	70	184*	024	-030	008	-020	-020	044	053	014	014	024	-234**	099	070	009
38	NOM Brain	71	219**	057	046	-027	-011	-061	040	010	052	-053	032	062	039	-072	-007
39	NOM Quiet One	75	038	-036	-039	024	096	-064	-076	-010	031	-034	-039	572**	-036	009	034
40	NOM Wild One	76	117*	-019	-052	219**	0	011	-013	-097	012	-106*	-022	-180*	-134*	109*	009
41	NOM Left Out	77	-110*	018	052	229**	-074	005	-023	023	-025	037	0	155*	030	-098	-004
42	NOM Behavior Model	89	050	-009	-027	-081	011	0	-015	532**	023	-066	006	-011	-084	011	0
43	NOM Neg. Behavior Model	90	-063	0	0	061	-022	013	-034	528**	025	-052	0	0	0	-019	-031
44	NOM Academic Model	82	240**	005	-029	-046	007	-027	-011	013	058	-024	012	128*	097	-007	-023
45	NOM Neg. Academic Model	83	-109*	-013	024	220**	-036	-026	024	050	015	062	005	085	154*	0	0
46	NOM Active	85	188**	024	-032	013	0	-024	028	037	0	0	057	-118*	080	082	022
47	NOM Passive (Avoidant)	86	078	-065	015	147*	043	037	117*	-060	-016	-018	019	259**	118*	182*	-037
48	NOM Impulsive	98	0	-031	-017	252**	0	-014	-048	-020	-017	0	-045	-019	047	-013	022
49	NOM Affective Neutrality	99	175*	-036	-072	005	062	-009	-024	-019	-013	028	0	191**	-008	0	-017
50	NOM Imaginative	72	282**	034	005	091	004	014	0	-136*	-054	-148*	051	-108*	-147*	0	027
51	NOM Daydreamer	73	059	030	035	241*	-045	063	016	-111*	-039	-040	016	-038	-277**	-033	-010
52	NOM Amoral	176	051	006	0	-004	006	028	022	-044	-063	-071	049	-023	706**	064	-020
53	NOM Expedient	177	-127*	017	-050	041	-038	-050	-062	-076	054	354**	-007	-206*	084	-064	-012
54	NOM Conforming	178	-114*	0	-018	-005	028	030	007	-058	0	367**	0	-044	-040	-026	0
55	NOM Conscientious	179	-085	011	029	0	007	-023	038	-049	0	326**	020	085	-113*	-055	-008
56	NOM Rational Altruistic	180	-056	014	-013	-036	0	006	046	-009	0	313**	006	068	-088	015	-018
57	Age-Mate IPS	64	255**	-011	-062	-091	035	062	-055	-055	053	-137*	-059	030	-016	-142*	006

TABLE A.29

Factor Loadings and Regression Weights for Appropriate Predictor Measures Describing Fifteen Factors as Dimensions of Behavior Among 1570 Students in the Seventh Grade at Four Texas Communities in the Human Talent Research Project.

(N = 1570)

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
I. Age-Mate Acceptance	72	NOM Imaginative	635**	282**
	64	Age-Mate IPS	532**	255**
	82	NOM Academic Model	697**	240**
	71	NOM Brain	659**	219**
	85	NOM Active	659**	188**
	70	NOM Wheel	598**	184**
	99	NOM Affective Neutrality	608**	175*
	76	NOM Wild One	215	117*
	83	NOM Negative Academic Model	-149	-109*
	77	NOM Left Out	-185	-110*
	178	NOM Non-Conforming	207	-114*
	177	NOM Expedient	124	-127*
II. Neurotic Anxiety	34	CYS Social Inadequacy	814**	382**
	32	CYS Personal Maladjustment	813**	370**
	25	CYS CMAS Anxiety	677**	213**
	31	CYS Self Inadequacy	612**	195*
	39	JPQ-1 Emotional Sensitivity	270*	151*
	41	JPQ-3 Neurotic vs. Ego Strength	466**	116*
	48	JPQ-10 Energetic Conformity	-282*	-115*
	70	CNN Need Achievement	-096	-117*
III. Convergent Thinking	143	DAT Mechanical Reasoning	731**	237**
	16	Gestalt Transformation	679**	231**
	161	DAT Space Relations	672**	228**
	1	CTMM Mental Function	700**	192**
	22	GFT Unusual Uses	605**	161**
	13	STEP Listening	614**	156**
	21	GFT Rhymes	602**	148*
	23	GFT Common Situations	150	-117*
IV. Peer Evaluated Impulsivity	98	NOM Impulsivity	781**	252**
	73	NOM Daydreamer	663**	241*
	77	NOM Left Out	686**	229**
	83	NOM Negative Academic Model	722**	220**
	76	NOM Wild One	643**	219**
	86	NOM Passive (Avoidant)	442**	147*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
V. Competence Motivation	44	JPQ-6 Cyclo vs. Schizothymia	523**	258**
	42	JPQ-4 Will Control vs. Relaxed	611**	234**
	51	SSHA Scholastic Motivation	581**	233**
	39	JPQ-1 Emotional Sensitivity	415**	217**
	62	Family Social Status (SR)	-081	-104*
	170	CNN Need Achievement	-019	-126*
	41	JPQ-3 Neurotic vs. Ego Strength	-465*	-156**
	26	CYS Critic of Education	-439**	-171*
	171	CNN Need Aggression	-521**	-236*
	47	JPQ-9 Independent Dominance	-601**	-247**
VI. Energetic Awareness	49	JPQ-11 Surgency vs. Desurgency	769**	537**
	48	JPQ-10 Energetic Conformity	583**	416**
	39	JPQ-1 Emotional Sensitivity	197	183*
	27	CYS Critic of Youth	025	135*
	13	STEP Listening	174	117*
	168	CNN Aggressive Anxiety	131	114*
	143	DAT Mechanical Reasoning	117	-116*
	170	CNN Need Achievement	-225	-161*
	171	CNN Need Aggression	-176	-193*
	42	JPQ-4 Will Control vs. Relaxed	-418	-270**
VII. Symbol Aptitude	14	KRT Short Words	652**	432**
	18	KRT Mutilated Words	627**	393**
	171	CNN Need Aggression	237	282*
	21	GFT Rhymes	360*	184*
	26	CYS Critic of Education	169	164*
	170	CNN Need Achievement	167	131*
	142	DAT Clerical Speed & Accuracy	331*	127*
	17	Gestalt Completion	284*	105*
	86	NOM Passive (Avoidant)	-106	-117*
	143	DAT Mechanical Reasoning	-100	-126*
	47	JPQ-9 Independent Dominance	-257*	-186*
	62	Family Social Status (SR)	-281*	-299**
VIII. Peer Stimulus Value	89	NOM Behavior Model	818**	532**
	90	NOM Negative Behavior Model	816**	528**
	62	Family Social Status (SR)	235	129*
	73	NOM Daydreamer	-096	-111*
	72	NOM Imaginative	-109	-136*
IX. Status Anxiety	170	CNN Need Achievement	772	585**
	168	CNN Aggressive Anxiety	704**	497**
	62	Family Social Status (SR)	306*	256*
	47	JPQ-9 Independent Dominance	119	153*
	41	JPQ-3 Neurotic vs. Ego Strength	097	112*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
X. "Peer Visibility"	178	NOM Conforming	764**	367**
	177	NOM Expedient	715**	354**
	179	NOM Conscientious	717**	326**
	180	NOM Rational Altruistic	740**	313**
	76	NOM Wild One	-103	-106*
	64	Age-Mate IPS	-008	-137*
	72	NOM Imaginative	026	-148*
XI. Divergent Thinking	23	GFT Common Situations	798**	483**
	24	GFT Consequences	757**	430**
	20	GFT Seeing Problems	686**	357**
	161	DAT Space Relations	-051	-156*
XII. Peer Isolation	75	NOM Quiet One	784**	572**
	86	NOM Passive (Avoidant)	330*	259**
	99	NOM Affective Neutrality	260*	191**
	77	NOM Left Out	225	155*
	82	NOM Academic Model	177	128*
	41	JPQ-3 Neurotic vs. Ego Strength	121	113*
	32	CYS Personal Maladjustment	-078	-100*
	72	NOM Imaginative	-134	-108*
	85	NOM Active	-155	-118*
	44	JPQ-6 Cyclo vs. Schizothymia	-109	-136*
	76	NOM Wild One	-287*	-180*
	177	NOM Expedient	-278*	-206*
	70	NOM Wheel	-321*	-234**
XIII. Amoral Self-gratification	176	NOM Amoral	809**	706**
	83	NOM Negative Academic Model	234	154*
	86	NOM Passive (Avoidant)	145	118*
	171	CNN Need Aggression	169	112*
	13	STEP Listening	140	101*
	179	NOM Conscientious	-113	-113*
	62	Family Social Status (SR)	-129	-128*
	76	NOM Wild One	-126	-134*
	72	NOM Imaginative	-186	-147*
	26	CYS Critic of Education	-179	-152*
	73	NOM Daydreamer	-297*	-277**
XIV. Reactive Passivity	58	PMT Dotting Test	505**	372**
	142	DAT Clerical Speed & Accuracy	451**	304**
	61	DRT Discrimination	369*	250**
	26	CYS Critic of Education	258*	244**
	17	Gestalt Completion	365*	235**
	86	NOM Passive (Avoidant)	047	182*
	168	CNN Aggressive Anxiety	206	163*
	161	DAT Space Relations	212	136*
	31	CYS Self Inadequacy	129	136*
	30	CYS Negative Social Orientation	122	132*
	76	NOM Wild One	113	109*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
XIV. (Cont.)	51	SSHA Scholastic Motivation	-070	-121*
	1	CTMM Mental Function	-027	-125*
	64	Age-Mate IPS	-083	-142*
	22	GFT Unusual Uses	-074	-151*
	21	GFT Rhymes	-070	-185**
	171	CNN Need Aggression	-399*	-341**
XV. Authoritarian Socialization or Alienation Syndrome	27	CYS Critic of Youth	769**	498**
	29	CYS Authoritarian Discipline	729**	447**
	30	CYS Negative Social Orientation	586**	310**
	25	CYS CMAS Anxiety	349*	103*
	34	CYS Social Inadequacy	011	-113*
	171	CNN Need Aggression	-086	-117*
	32	CYS Personal Maladjustment	021	-121*
	62	Family Social Status (SR)	-267*	-126*

TABLE A.30

INTERCORRELATION OF SEVENTH GRADE PREDICTOR VARIABLES

No.	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Age-Mate Acceptance	1.0	02	03	09	03	-07	-06	25	13	14	01	16	22	-12	-11
2	Neurotic Anxiety		1.0	-03	-06	-05	07	02	01	-06	02	-06	01	-03	11	11
3	Convergent Thinking			1.0	08	00	-13	-13	-07	11	-06	22	04	-05	-22	-17
4	Peer-evaluated Impulsivity				1.0	03	-08	-03	03	-04	07	00	03	12	-17	-11
5	Competence Motivation					1.0	-03	-04	02	05	-03	03	08	00	-07	-08
6	Energetic Awareness						1.0	11	-16	-03	02	-01	-04	-12	10	10
7	Symbol Aptitude							1.0	-10	07	-06	-04	-05	-04	08	01
8	In-groupness								1.0	16	20	08	15	37	-03	-18
9	Status Anxiety									1.0	04	-02	00	06	-01	05
10	Peer Visibility										1.0	05	-10	12	07	-08
11	Divergent Thinking											1.0	07	-02	-07	02
12	Peer Isolation												1.0	-01	-08	-07
13	Amoral Self-gratification													1.0	-14	-06
14	Reactive Passivity														1.0	13
15	Alienation Syndrome															1.0

TABLE A.31

Varimax Factor Structure of 39 Dimensional Variables (Predictor Measures) in Ninth-Grade Year at Four Community Locations of the Human Talent Research Program (N = 1464)

(Entries rounded, no decimal points; "**" designates highest loading in row, "*" other major loadings)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX	h^2
1	CTMM Intelligence	212	724**	169	-054	-108	-230	-016	044	-048	015	624
2	STEP Listening	225	733**	180	-019	-111	-267*	113	219	-029	011	715
3	Gestalt Transformation	279	702**	089	057	-121	-181	-185	009	-030	034	588
4	DAT Abstract Reason	160	734**	142	-075	-077	-156	-002	042	-134	-118	628
5	DAT Space Relations	161	736**	129	-008	-064	-005	-042	008	006	-103	576
6	GFT Unusual Uses	284	549**	128	006	-060	-406*	100	091	-003	034	505
7	GFT Consequences	283	281*	122	019	-025	-696**	-017	038	044	013	583
8	GFT Com. Situations	282	350*	140	-023	-085	-660**	-045	053	-041	063	596
9	GFT Seeing Problems	285	344*	060	-007	-075	-648**	031	030	010	111	562
10	KRT Mutilated Words	280	075	138	-080	-082	-646**	064	-002	-229	-067	515
11	KRT Short Words	281	095	055	005	-062	-630**	083	-051	-159	-056	451
12	JPQ-1 Em. Sensitivity	267	-161	035	014	219	-086	758**	-070	-043	-020	665
13	JPQ-11 Surgency	270	-025	-099	030	264	-290*	096	372**	-291*	087	404
14	SSHA Schol. Motiv'n	256	255*	200	-083	-504**	-226	410	-072	012	058	593
15	CMAS Anxiety	263	-159	-075	006	749**	059	-010	-255*	-045	-066	666
16	CYS Authoritarian	265	-196	-060	-008	064	172	-026	-759**	069	-075	663
17	CYS Critic of Youth	266	-074	-038	-006	217	-076	100	-747**	-049	-004	630
18	CYS Neg. Soc. Orient'n	264	-415*	-119	022	335*	062	-322*	-487**	022	-090	653
19	CYS Pers. Maladjustment	258	-074	-044	029	766**	162	074	-081	164	-090	669
20	CYS Social Inadequacy	257	-109	-028	051	797**	098	-129	-044	012	036	680
21	NNA Achievement	260	-076	-063	021	646**	-056	128	033	042	102	460
22	NNA Aggression	261	-034	-072	082	453*	032	-602**	017	-028	078	589
23	NNA Aggression Anxiety	259	-019	093	-061	-058	-148	158	-412**	036	259*	300
24	ISS Family Status (Signs Reversed)	371	472	080	-045	-091	-166	030	129	-248	022	347
25	P-NOM Brain	364	193	874**	072	-046	-072	-013	-015	083	013	821
26	P-NOM Quiet One	346	162	048	501	046	175	334*	-071	-007	-480**	660
27	P-NOM Left Out	348	012	-014	891**	057	055	066	012	-012	-057	808
28	P-NOM Behavior Model	340	085	436*	191	-123	-152	-056	017	-610**	-243	706
29	P-NOM Neg. Beh. Model	341	-104	008	864**	044	-064	-080	037	-150	124	810
30	P-NOM Academic Model	356	111	818**	-057	-117	-171	041	006	-228	-089	789
31	P-NOM Neg. Academic Model	358	-125	027	657**	066	054	-180	046	018	437*	681
32	P-NOM Copes with Difficulty	363	149	926**	-016	-074	-108	-016	022	-121	016	912
33	P-NOM Avoids Failure	357	140	943**	-005	-061	-112	053	010	-062	-010	932
34	P-NOM Imaginative	344	194	476**	292	-146	-206	-121	024	-449*	-182	663
35	P-NOM Amoral	176	-026	-025	171	022	046	006	-012	-189	677**	528
36	P-NOM Expedient	177	081	158	143	-050	-133	-051	-011	-654**	402*	664
37	P-NOM Conforming	178	106	241	-031	-023	-096	042	065	-763**	136	686
38	P-NOM Conscientious	179	215	621**	019	-013	-029	099	-000	-380*	153	611
39	P-NOM Rat'l Altruistic	180	149	622**	-080	-036	-073	187	052	-474*	069	689

TABLE A.32

Modal Values for 39 Dimensional Variables (Predictors) Over 9 Factors for Students in Ninth-Grade Year in Four Community Locations of the Human Talent Research Program (N = 1464)

(Entries rounded, no decimal points; "**" denotes highest modal value in row; "*", other significant values)

No.	Name	MFN	I	II	III	IV	V	VI	VII	VIII	IX
1	CTMM Intelligence	212	235**	-021	-006	024	041	-013	-054	010	040
2	STEP Listening	225	212**	-012	0	054	023	062	048	038	034
3	Gestalt Transformation	279	239**	-042	032	0	052	-118*	-091	007	038
4	DAT Abstract Reason	160	245**	-063	-024	044	082	-006	-057	-067	-061
5	DAT Space Relations	161	290**	-029	004	033	150*	-030	-079	0	-029
6	GFT Unusual Uses	284	122**	-017	021	041	-087	049	0	064	039
7	GFT Consequences	283	-048	006	042	030	-316**	-055	0	130*	-018
8	GFT Com. Situations	282	-012	0	010	006	-264**	-066	-004	079	010
9	GFT Seeing Problems	285	0	-017	019	010	-254**	-005	-017	090	064
10	KRT Mutilated Words	280	-127*	-019	-021	-006	-292**	-014	-004	-063	-110*
11	KRT Short Words	281	-082	-044	016	-007	-290**	005	-043	-030	-092
12	JPQ-1 Em. Sensitivity	267	-040	-004	014	112*	-026	509**	010	-010	027
13	JPQ-11 Surgency	270	-075	-066	-015	130*	-126*	078	233**	-140*	-005
14	SSHA Schol. Motiv'n	256	021	0	0	-141*	-017	234**	-095	060	097
15	CMAS Anxiety	263	030	0	-035	260**	-009	027	-077	-058	-044
16	CYS Authoritarian	265	042	-010	012	-049	041	-033	-436**	-030	-019
17	CYS Critic of Youth	266	068	-044	004	025	-037	058	-436**	-065	016
18	CYS Neg. Soc. Orient'n	264	-082	0	0	030	-091	-212*	-232**	-046	-109*
19	CYS Pers. Maladjustment	258	077	037	0	285**	046	092	023	065	-023
20	CYS Social Inadequacy	257	041	040	-017	290**	005	-023	038	005	018
21	NNA Achievement	260	018	014	-019	259**	-041	135*	076	042	094
22	NNA Aggression	261	030	019	-004	133*	-023	-364**	021	-007	011
23	NNA Aggression Anxiety	259	021	024	-012	-034	-045	103*	-258**	065	246*
24	ISS Family Status	371	-147**	070	031	-016	-046	-018	-008	124*	-008
25	P-NOM Brain	364	-034	269**	022	042	004	-052	0	241	064
26	P-NOM Quiet One	346	093	-030	237*	015	093	214*	-042	-033	-340**
27	P-NOM Left Out	348	018	-014	383**	-004	0	062	0	048	-058
28	P-NOM Behavior Model	340	-053	0	044	-040	-011	-074	-011	-301**	-275*
29	P-NOM Neg. Beh. Model	341	-038	-004	361**	-039	-068	-020	0	0	018
30	P-NOM Academic Model	356	-089	200**	-034	0	-024	-038	006	011	-056
31	P-NOM Neg. Academic Model	358	-014	042	254*	-008	0	-061	012	128*	307**
32	P-NOM Copes with Difficulty	363	-044	269**	-004	005	0	-028	016	120*	028
33	P-NOM Avoids Failure	357	-036	285**	0	015	0	0	036	125*	012
34	P-NOM Imaginative	344	-022	030	101*	-036	-042	-131*	-013	-160*	-198**
35	P-NOM Amoral	176	055	-014	033	0	087	067	-045	-030	503**
36	P-NOM Expedient	177	025	-074	0	-010	041	-011	-069	-306**	233*
37	P-NOM Conforming	178	016	-069	-080	007	069	024	0	-407**	017
38	P-NOM Conscientious	179	042	115*	-022	032	107*	060	-019	-096	120**
39	P-NOM Rat'l Altruistic	180	0	088	-073	049	067	099	011	-157**	037

TABLE A.33

Factor Loadings and Regression Weights for Appropriate Predictor Measures Describing Nine Factors as Dimensions of Behavior among 1464 Students in the Ninth Grade at Four Texas Communities of The Human Talent Research Program (HTRP)

(N = 1464)

Factor Variable		MFN	Predictor Measure	Factor Loading	Weight
I.	Convergent Thinking	161	DAT Space Relations	736**	290**
		160	DAT Abstract Reasoning	734**	245**
		279	Gestalt Transformation	702**	239**
		212	CTMM Intelligence	724**	235**
		225	STEP Listening	733**	212**
		371	ISS Family Status	472**	147**
		284	GFT Unusual Uses	549**	122**
		280	KRT Mutilated Words	075	-127*
II.	Peer Evaluated Brain	357	P-NOM Avoids Failure	943**	285**
		364	P-NOM Brain	874**	269**
		363	P-NOM Copes with Difficulty	926**	269**
		356	P-NOM Academic Model	818**	200**
		179	P-NOM Conscientious	621**	115*
III.	Peer Evaluated Isolation	348	P-NOM Left-Out	891**	383**
		341	P-NOM Negative Behavior Model	864**	361**
		358	P-NOM Negative Academic Model	657**	254*
		346	P-NOM Quiet One	501**	237*
		344	P-NOM Imaginative	292*	101*
IV.	Neurotic Anxiety	257	CYS Social Inadequacy	797**	290**
		258	CYS Personal Maladjustment	766**	285**
		263	CMAS Anxiety	749**	260**
		260	NNA Achievement	646**	259**
		261	NNA Aggression	453*	133*
		270	JPQ-11 Surgency vs. Desurgency	264*	130*
		267	JPQ-1 Emotional Sensitivity	219	112*
		256	SSHA Scholastic Motivation	-504**	-141*
V.	Divergent Thinking	283	GFT Consequences	696**	316**
		280	KRT Mutilated Words	646**	292**
		281	KRT Short Words	630**	290**
		282	GFT Common Situations	660**	264**
		285	GFT Seeing Problems	648**	254**
		270	JPQ-11 Surgency vs. Desurgency	290*	126*
		161	DAT Space Relations	005	-150*
		179	P-NOM Conscientious	029	-107*

Factor Variable	MFN	Predictor Measure	Factor Loading	Weight
VI. Competence Motivation	267	JPQ-1 Emotional Sensitivity	758**	509**
	256	SSHA Scholastic Motivation	410*	234**
	346	P-NOM Quiet One	335*	214*
	260	NNA Achievement	128	135*
	259	NNA Aggression Anxiety	158	103*
	279	Gestalt Transformation	-185	-118*
	344	P-NOM Imaginative	-121	-131*
	264	CYS Negative Social Orientation	-322*	-212*
	261	NNA Aggression	-602**	-364**
VII. Alienation Syndrome	266	CYS Criticism of Youth	747**	436**
	265	CYS Authoritarian	759**	436**
	259	NNA Aggression Anxiety	412**	258**
	264	CYS Negative Social Orientation	487**	232**
	270	JPQ-11 Surgency vs. Desurgency	-372**	-233**
VIII. Peer Visibility	178	P-NOM Conforming	763**	407**
	177	P-NOM Expedient	654**	306**
	340	P-NOM Behavior Model	610**	301**
	344	P-NOM Imaginative	449*	160*
	180	P-NOM Rational Altruistic	474*	157*
	270	JPQ-11 Surgency vs. Desurgency	291*	140*
	371	ISS Family Status	249	124*
	363	P-NOM Copes with Difficulty	121	-120*
	357	P-NOM Avoids Failure	062	-125*
	358	P-NOM Negative Academic Model	018	-128*
	283	GFT Consequences	044	-130*
	364	P-NOM Brain	083	-241*
IX. Peer Evaluated Impulsivity	176	P-NOM Amoral	677**	503**
	358	P-NOM Negative Academic Model	437*	307**
	259	NNA Aggression Anxiety		246*
	177	P-NOM Expedient	403*	233*
	179	P-NOM Conscientious	153	120**
	264	CYS Negative Social Orientation	-090	-109*
	280	KRT Mutilated Words	-067	-110*
	344	P-NOM Imaginative	-182	-198**
	340	P-NOM Behavior Model	125	-275*
	346	P-NOM Quiet One	-480*	-340**

TABLE A.34

INTERCORRELATION OF NINTH GRADE PREDICTOR VARIABLES

No.	Variable	16	17	18	19	20	21	22	23	24
16	Convergent Thinking (I)	1.0	00	04	04	11	-04	-11	04	05
17	Peer-evaluated Brain (II)		1.0	-07	04	03	-00	03	04	03
18	Peer-evaluated Isolation (III)			1.0	08	02	04	-07	13	11
19	Neurotic Anxiety (IV)				1.0	-02	06	04	-06	-06
20	Divergent Thinking (V)					1.0	03	02	-05	-06
21	Competence Motivation (VI)						1.0	11	04	02
22	Alienation Syndrome (VII)							1.0	-01	-04
23	Peer Visibility (VIII)								1.0	-22
24	Peer-evaluated Impulsivity (IX)									1.0

TABLE A.35

INTERCORRELATION OF SEVENTH GRADE AND NINTH GRADE PREDICTOR VARIABLES

		Variable - 9th Grade								
		Convergent Thinking	Peer-evaluated Brain	Peer-evaluated Isolation	Neurotic Anxiety	Divergent Thinking	Competence Motivation	Alienation Syndrome	Peer Visibility	Peer-evaluated Impulsivity
No.	Variable - 7th Grade	16	17	18	19	20	21	22	23	24
1	Age-Mate Acceptance	04	43	-11	-08	-00	-05	02	-19	01
2	Neurotic Anxiety	-01	08	07	49	-02	14	02	-01	-07
3	Convergent Thinking	71	13	04	-03	-03	-18	-04	17	-06
4	Peer-evaluated Impulsivity	-03	-10	38	01	01	-10	-01	-11	26
5	Competence Motivation	-07	-07	-10	29	14	-45	-01	-07	-09
6	Energetic Awareness	-10	-05	-07	10	-05	25	28	-17	01
7	Symbol Aptitude	-09	-07	07	-05	33	-01	13	10	01
8	Peer Stimulus Value	-05	20	07	02	05	06	04	-09	-06
9	Status Anxiety	04	05	-01	-03	09	-20	24	00	-13
10	Peer Visibility	03	45	-07	06	04	08	05	-69	42
11	Divergent Thinking	08	09	04	-02	50	03	04	-02	-11
12	Peer Isolation	06	21	04	19	16	33	09	29	-34
13	Amoral Self-gratification	-01	-05	17	-06	-00	-01	07	-14	39
14	Reactive Passivity	-01	04	-15	01	-05	12	00	-14	-10
15	Alienation Syndrome	00	-03	04	-03	03	02	34	04	-04

r = .12, ** $p < .01$; r = .01, * $p < .05$

ing (.71), Divergent Thinking (.50), Neurotic Anxiety (.49), Peer Evaluated Impulsivity (.26), and the Alienation Syndrome (.34). Other expected correlations either tend to be low or negative, reinforcing the inference of change or transformation on cognitive and noncognitive attributes from preadolescent to early adolescent years. The next two tables A.36 and A.37, pp. A-126 and A-127) represent relations between early adolescent (ninth-grade) predictor factors and later adolescent (twelfth grade) criterion factor variables during "The Years of Transition."

Finally, the regressions of the fifteen twelfth-grade criteria of talented behavior on the two sets of predictor factors are included to complete the basic data tables. Table A.38 on p. A-128 shows regressions upon the fifteen "predictor variables" identified in the seventh-grade year. Quite clearly, there is a high multiple correlation (.695) between Academic Performance at high school graduation and the seventh-grade predictors. Reference to Table A.36 on p. A-126, however, shows that the product-moment correlation between Convergent Thinking in grade VII and Academic Performance in grade XII (.62) is almost as high. Table A.39 on p. A-129 records regressions of the criterion factors upon the nine ninth-grade predictors. Further discussion relative to Tables A.38 and A.39 may be found in the Gestalten or configurations represented by the factor variables employed in "Dimensions and Criteria of Talented Behavior" to summarize findings upon the HTRP study of valued and disvalued talents during the senior high school years.

221

TABLE A.36

INTERCORRELATION OF SEVENTH GRADE PREDICTOR VARIABLES AND TWELFTH GRADE CRITERION VARIABLES

N = 625

		Variable - 12th Grade														
		Teacher Evaluated Productive Thinking	Peer Evaluated Creative Effectiveness	Academic Performance	Rhetorical Ability	Teacher Evaluated Social Poise	Musical Ability	Striving Scientist	Artistic Ability	Potential Delinquent	Athletic Ability	Reputed Brain	Recognized Strainer	Mechanical Aptitude	Potential Politician	Interpretive Sensitivity
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
No.	Variable - 7th Grade	25	26	27	28	29	30	31	32	33	34	34	36	37	38	39
1	Age-Mate Acceptance	-01	30	13	07	21	00	00	-02	10	10	22	04	04	03	-02
2	Neurotic Anxiety	-05	02	-08	04	06	03	-03	-01	-05	-03	01	01	-11	05	-06
3	Convergent Thinking	05	10	62	-06	02	06	08	-07	01	-04	10	-02	-04	12	-05
4	Peer-evaluated Impulsivity	05	-05	-06	06	00	05	10	04	32	04	-06	-02	04	08	-10
5	Competence Motivation	-05	-04	-11	-11	-16	-03	08	06	06	16	03	-02	12	08	-06
6	Energetic Awareness	03	02	-04	06	13	04	-08	04	02	-08	-09	03	-03	-08	-05
7	Symbol Aptitude	00	-15	-17	00	-09	-05	-05	00	06	00	-07	00	05	-02	05
8	In-groupness	-05	24	-09	-07	05	00	-06	-05	-03	09	09	-01	-06	-07	11
9	Status Anxiety	-01	10	03	-10	00	-08	00	-09	09	09	00	00	07	03	-03
10	Peer Visibility	04	38	00	04	16	09	-06	-06	14	05	17	08	01	-05	09
11	Divergent Thinking	03	04	-01	-07	-01	08	-03	-05	01	-09	06	-02	-01	02	00
12	Peer Isolation	-09	-07	-01	03	11	00	-12	09	-20	-05	29	02	-01	-04	02
13	Amoral Self-gratification	03	11	-04	-08	-06	-04	02	-01	-03	00	-02	-06	-06	00	00
14	Reactive Passivity	-07	-02	-09	-06	12	02	-09	-01	-02	00	03	01	-05	-08	06
15	Alienation Syndrome	-01	-10	02	05	04	-02	-05	-01	08	-08	-03	04	02	-04	00

r = .12, ** $p < .01$; r = .09, * $p < .05$

TABLE A.37

INTERCORRELATION OF NINTH GRADE PREDICTOR AND TWELFTH GRADE CRITERION FACTOR VARIABLES

		Variable - 12th Grade														
		Teacher Evaluated Productive Thinking I	Peer Evaluated Creative Effectiveness II	Academic Performance III	Rhetorical Ability IV	Teacher Evaluated Social Poise V	Musical Ability VI	Striving Scientist VII	Artistic Ability VIII	Potential Delinquent IX	Athletic Ability X	Reputed Brain XI	Recognized Strainer XII	Mechanical Aptitude XIII	Potential Politician XIV	Interpretive Sensitivity XV
No.	Variable - 9th Grade	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
16	Convergent Thinking (I)	01	03	64	-06	05	06	08	-07	03	-05	05	-00	02	10	-02
17	Peer-evaluated Brain (II)	01	47	14	11	27	16	-16	01	01	03	56	02	-00	-05	02
18	Peer-evaluated Isolation (III)	05	-08	-06	-04	-02	05	-00	-04	18	-08	-04	-10	01	03	-02
19	Neurotic Anxiety (IV)	-05	00	-14	-01	01	06	-00	08	-01	00	08	-03	-06	-02	-01
20	Divergent Thinking (V)	-11	-06	-15	-08	-04	-07	-08	-05	01	02	08	01	13	07	-02
21	Competence Motivation (VI)	-05	-13	-08	09	23	00	-18	08	-22	-17	04	01	-14	-17	09
22	Alienation Syndrome (VII)	-01	-01	02	03	09	-02	-14	-01	05	-06	-03	03	-07	-03	01
23	Peer Visibility (VIII)	-01	-24	05	01	-07	-02	-03	07	-22	-11	13	-08	-02	01	-02
24	Peer-evaluated Impulsivity (IX)	10	08	04	00	04	08	06	00	20	-02	-02	-01	02	03	02

r = .12, ** $p < .01$; r = .09, * $p < .05$

TABLE A.38

Regression of 15 Twelfth-Grade Criterion Factor Variables on 15 Seventh-Grade Predictor Factors (N = 629)

	Criterion Variables--12th Grade Talents														
	Teacher Evaluated Productive Thinking I	Peer Evaluated Creative Effectiveness II	Academic Performance III	Rhetorical Ability IV	Teacher Evaluated Social Poise V	Musical Ability VI	Striving Scientist VII	Artistic Ability VIII	Potential Delinquent IX	Athletic Ability X	Reputed Brain XI	Recognized Strainer XII	Mechanical Aptitude XIII	Potential Politician XIV	Interpretive Sensitivity XV
Grade VII Predictors															
I. Age-Mate Acceptance	.000	.253	.148	.091	.215	.000	.011	-.012	.121	.076	.177	.046	.062	.036	-.040
II. Neurotic Anxiety	-.043	.000	-.101	.021	.011	.021	.000	-.014	-.037	-.025	.000	.000	-.104	.069	-.076
III. Convergent Thinking	.041	.112	.685	-.040	.057	.053	.059	-.061	.000	-.031	.093	.000	-.051	.087	.000
IV. P-evaluated Impulsivity	.041	-.110	-.106	.053	.000	.045	.085	.039	.341	.023	-.097	-.014	.030	.065	-.105
V. Competence Motivation	-.041	-.034	-.098	-.110	-.160	-.024	.077	.058	.077	.160	.018	-.016	.112	.078	-.056
VI. Energetic Awareness	.039	.065	.301	.055	.133	.041	-.060	.033	.025	-.054	-.081	.018	-.038	-.071	-.047
VII. Symbol Aptitude	.000	-.098	-.090	.000	-.093	-.033	-.039	.000	.061	.000	-.021	.000	.040	.000	.071
VIII. Peer Stimulus Value	-.048	.130	-.042	-.032	.020	.016	-.052	-.054	.000	.094	-.013	.000	-.062	-.082	.128
IX. Status Anxiety	.000	.028	-.067	-.096	-.019	-.082	.000	-.081	.086	.049	-.034	-.011	.068	.023	-.065
X. Peer Visibility	.032	.312	.043	.048	.144	.084	-.068	-.041	.099	.018	.199	.098	.024	-.038	.087
XI. Divergent Thinking	.020	.000	-.157	-.080	-.027	.070	-.035	-.035	.017	-.097	.012	-.030	.000	.000	-.013
XII. Peer Isolation	-.083	-.102	-.016	.039	.123	.000	-.147	.093	-.214	-.085	.283	.027	-.017	-.053	.028
XIII. Amoral Self-gratification	.029	-.013	.000	-.102	-.092	-.044	.016	.017	-.104	-.067	-.070	-.079	-.067	.000	-.027
XIV. Reactive Passivity	-.066	.000	.036	-.101	.117	.029	-.047	.000	.000	.000	.058	-.014	-.041	-.046	.036
XV. Alienation Syndrome	.000	-.031	.133	.062	.047	.000	-.027	-.011	.114	-.039	.024	.047	.028	-.020	.021
RSQ =	.027	.272	.483	.067	.159	.032	.059	.034	.211	.070	.182	.019	.048	.046	.052
R =	....	.165	.695	....	.126	....	....	....	.145	....	.135	....	....	....	....

TABLE A.39

Regression of 15 Twelfth-Grade Criterion Factor Variables on 9 Ninth-Grade Predictor Factors (N = 629)

	Criterion Variables--12th Grade Talents														
	Teacher Evaluated Productive Thinking	Peer Evaluated Creative Effectiveness	Academic Performance	Rhetorical Ability	Teacher Evaluated Social Poise	Musical Ability	Striving Scientist	Artistic Ability	Potential Delinquent	Athletic Ability	Reputed Brain	Recognized Strainer	Mechanical Aptitude	Potential Politician	Interpretive Sensitivity
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV
Grade IX Predictors															
I. Convergent Thinking	.000	.046	.690	-.050	.077	.062	.068	-.075	.020	-.053	.032	.012	.000	.084	-.015
II. Peer-evaluated Brain	.011	.490	.154	.107	.279	.159	-.150	.000	.025	.031	.551	.025	.000	-.049	.023
III. P-evaluated Isolation	.047	.000	-.034	-.030	.000	.055	-.020	-.063	.210	-.059	-.032	-.083	.016	.033	-.017
IV. Neurotic Anxiety	-.044	-.028	-.170	-.013	-.024	.052	.021	.093	-.019	.013	.072	-.028	-.047	.000	-.012
V. Divergent Thinking	-.099	-.084	-.246	-.081	-.065	-.067	-.071	-.040	.000	.020	.072	.000	.132	.063	-.022
VI. Competence Motivation	-.048	-.125	-.052	.090	.232	.000	-.169	.076	-.235	-.159	.036	.016	-.138	-.175	.088
VII. Alienation Syndrome	.000	.000	.095	.000	.062	-.010	-.114	-.037	.087	-.053	-.052	.029	-.054	.000	.000
VIII. Peer Visibility	.000	-.263	-.029	.000	-.090	.019	.000	.083	-.216	-.100	.108	-.077	-.013	.015	-.024
IX. P- evaluated Impulsivity	.089	.000	-.111	.000	.000	.078	.057	.032	.131	-.032	.000	-.023	.022	.027	.015
RSQ =	.261	.318	.534	.030	.146	.047	.084	.030	.169	.050	.341	.017	.044	.047	.010
R =	.164	.178	.731	....	-.121	....	....	....	.130	....	.84	....	....	....	....

APPENDIX A

Section VI

DATA FOR A COMPARATIVE STUDY OF ADOLESCENT VALUE-ATTITUDES

A decade ago, with one of the early USOE cooperative research grants, James S. Coleman and his associates at Chicago undertook a cross-sectional study of social climates in high schools located in Illinois. Their findings were reported in a Cooperative Research Monograph (1961a), in a book entitled The Adolescent Society (1961b), and in two journal articles by Coleman (1959, 1960). The research confirmed the existence of adolescent subcultures and supported the proposition that, by and large, teen-agers do not look toward the adult community for their social rewards. In the book, the investigators inferred that the fundamental competition in any high school is for "recognition and respect--the elements of which status is composed--in the eyes of one's fellows and the opposite sex" (1961b, p. 143). They were impressed by the value-loadings attached to athletics for boys and to being a leader in activities for girls in an institution designed to focus attention on studies. True, they reported variations in the relative importance of athletics and other non-academic values and the downgrading of intellectual values by boys and girls from one community to the other. Members of the research team were not surprised, however, by the Coleman reports. McGuire's dissertation, "Adolescent Society and Social Mobility" (Chicago, 1949), had been undertaken in the community known as Elmtown in the Coleman book. Subsequently, he and his students engaged in "The Textown Study of Adolescence" (McGuire, 1956) had already encountered the values attached to being an "athlete" among boys or "a leader in activities" among girls.

The Human Talent Research Program (HTRP) also was initiated in the spring of 1957 as a longitudinal study of an age-grade in four relatively small Texas cities. The six-year study of a single age-grade has revealed that striking transformations in the boys and girls of the four populations take place from preadolescent to early adolescent years (McGuire, 1961; McGuire & Associates, 1967a). The changes are not only in cognitive behavior but also in personality attributes and the sets of behavioral capabilities which are valued and labeled as talents. But something else was noticed by members of the HTRP research group and confirmed in interviews with young people and elders who worked with them. The evidence pointed to an emerging zeitgeist which favored the cultivation of intellectual talent Thus the recent HTRP studies focus upon the development of talent, a "farming" instead of a "mining" approach where talent identification is paramount. The key element in a new climate for education seems to be a fresh view of man and his intellectual behavior which

226

negates long-held ideas of fixed intelligence and predetermined development. The strongest evidence for the shift in assumptions implicit in our concept of development and in the current educational renaissance may be found in Hunt's inquiry into Intelligence and Experience (1961) and two of the recent SRCD monographs (Stevenson, 1966; Skeels, 1966).

The new spirit of the times began to appear as most of the HTRP populations were undergoing the transition from childhood to adolescence. They were growing up in the "space age" and the very communities in which they lived were reshaping themselves as a consequence of the world-wide emergence of a new era in the lives of human beings.[1] This new outlook is influencing the values and attitudes of human beings in the second half of the twentieth century (just as men in the mid-18th century awakened to the ideas about the brotherhood of man and the social contract). The research group predicted that, if the reasoning had some bases in truth, the HTRP population would represent themselves as more concerned about being a "brilliant student" in accord with the changing zeitgeist than being remembered as a "star athlete," or a "leader in activities," the value preferences of the boys and girls respectively in the high school populations in Illinois investigated by Coleman.

Method

To test their prediction, the research team decided to elicit certain questionnaire data from the HTRP population in 1962-63. The intention was to parallel some of the data on the "climate of values" obtained by James S. Coleman and his associates five years earlier from all potential members of the adolescent societies based in nine Illinois high schools whose general characteristics are described succinctly in Table 1 of Coleman's article in the Harvard Educational Review (1959, p. 331). Accordingly, a "General Information Questionnaire" was prepared. The instrument employed relevant items selected from the several forms of the "Study of High School Social Climates," the attitude questionnaries reprinted as an appendix to The Adolescent Society (Coleman, 1961, pp. 337ff). The 28 items selected by the research team are entered in Table A.40 which shows the number of respondents in their year of high school graduation enrolled in the senior high schools of the four Texas communities par-

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[1] At least four indicators of the emergent new era could be recognized as early as 1962; namely, (a) a world-wide explosion of knowledge, (b) the impact of the electronic computer and automation, (c) the development of new systems of energy transformation and new ways to utilize materials, (d) simpler societies losing the status of colonies and "leapfrogging into the future."

TABLE A.40

Frequency Counts, Mean Ranks, and First Choices Regarding Relative Importance of Items Reflecting Value Systems Among High School Seniors in Four Texas Communities According to Sex Roles

	General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
		M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
	Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
1	"Average" time spend doing homework outside school. (Frequency of choices)															
	none, or almost none.	2	0	2	6	2	8	12	4	16	10	1	11	30	7	37
	less than 1/2 hour a day.	4	2	6	9	1	10	17	5	22	9	1	10	39	9	48
	about 1/2 hour a day.	38	18	56	27	14	41	58	42	100	22	14	36	145	88	233
	about 1-1/2 hours a day.	36	22	58	16	12	28	17	25	42	8	12	20	77	71	148
	about 2 hours a day.	23	48	71	5	13	18	30	38	68	5	13	18	63	112	175
	3 or more hours a day.	14	33	47	2	7	9	10	20	30	7	9	16	33	69	102
2a	Relative importance among things strived for. (Mean ranks from 1-4)															
	pleasing my parents.	2.3	2.4	2.3	2.25	2.7	2.4	2.1	2.1	2.1	2.0	1.9	2.0	2.2	2.2	2.2
	learning as much as possible in school.	2.3	2.5	2.4	2.67	2.5	2.6	2.6	2.7	2.6	2.4	2.6	2.5	2.5	2.6	2.6
	living up to my religious ideals.	2.7	2.0	2.3	2.44	2.0	2.2	2.7	2.5	2.6	2.8	2.3	2.6	2.7	2.2	2.5
	being accepted and liked by other students.	2.8	3.2	3.0	2.6	2.8	2.7	2.7	2.8	2.7	2.8	3.1	3.0	2.7	2.9	2.8
2b	Relative importance... (first choices).															
	pleasing my parents.	30	20	50	18	5	23	53	48	101	20	19	39	121	92	213
	learning as much as possible in school.	35	27	62	6	13	19	32	20	52	14	11	25	87	71	158
	living up to my religious ideals.	27	48	75	22	23	45	36	41	77	13	15	28	98	127	225

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
2b (Continued)															
being accepted and liked by other students.	23	15	38	18	10	28	40	33	73	14	5	19	95	63	158
3a Rank importance of these items. (Mean ranks from 1-4)															
groups and activities outside school.	2.9	3.2	3.1	2.9	2.9	2.9	3.0	3.0	3.0	3.0	3.2	3.1	2.9	3.1	3.0
activities associated with school.	2.8	2.7	2.8	3.0	2.8	2.9	3.0	2.9	2.9	2.9	3.0	3.0	2.9	2.8	2.9
having a good time.	2.5	2.9	2.7	2.4	3.0	2.7	2.4	2.8	2.6	2.4	2.5	2.5	2.4	2.8	2.6
a good reputation.	1.8	1.2	1.5	1.7	1.3	1.5	1.7	1.4	1.5	1.6	1.3	1.5	1.7	1.3	1.5
3b Rank importance... (first choices).															
groups and activities outside school.	11	0	11	7	2	9	15	9	24	6	3	9	39	14	53
activities associated with school.	19	7	26	7	7	14	19	13	32	8	2	10	53	29	82
having a good time.	24	4	28	16	3	19	45	10	55	13	5	18	98	22	120
a good reputation.	69	107	176	38	41	79	86	111	197	41	42	83	234	301	535
4 Parents have rules for:															
time for being in at night on weekends.	57	93	150	37	45	82	71	93	164	43	42	85	208	273	481
amount of dating.	14	59	73	8	24	32	20	45	65	13	22	35	55	150	205
against going steady.	10	17	27	10	7	17	17	23	40	12	12	24	49	59	108
time spent watching TV.	9	15	24	16	10	26	19	11	30	14	3	17	58	39	97
time spent on homework.	26	33	59	20	13	33	44	28	72	24	11	35	114	85	199
against going around with certain boys	40	57	97	32	29	61	46	68	114	32	36	68	150	190	340

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
4 (Continued)															
against going out with certain girls.	17	32	49	14	16	30	35	55	90	20	32	52	86	135	221
eating dinner with the family	25	18	43	13	10	23	24	26	50	12	9	21	74	63	137
no rules for any of the above items.	45	18	63	19	4	23	58	22	80	18	3	21	140	47	187
5 What's important to be popular in your crowd?															
be a good dancer.	17	9	26	11	6	17	41	26	67	19	24	43	88	65	153
have sharp clothes.	20	12	32	19	5	24	54	24	78	15	11	26	108	52	160
have a good reputation.	84	112	196	45	42	87	118	120	238	44	45	89	291	319	600
stirring up a little excitement.	33	8	41	25	11	36	66	47	113	30	20	50	154	86	240
have money.	22	7	29	13	1	14	35	11	46	17	4	21	87	23	110
smoking.	1	2	3	1	0	1	7	4	11	4	7	11	13	13	26
being up on cars.	35	1	36	7	0	7	40	8	48	18	4	22	100	13	113
know what's going on in the world of popular singers and movie stars.	10	8	18	3	2	5	14	12	26	3	9	12	30	31	61
6 Do you date:															
no.	13	10	23	7	1	8	18	14	32	7	2	9	45	27	72
yes, about once a month.	23	10	33	6	7	13	24	11	35	16	9	25	69	37	106
yes, once every 2 or 3 weeks.	10	9	19	9	4	13	24	19	43	10	11	21	53	43	96
yes, about once a week.	29	13	42	12	9	21	37	27	64	14	8	22	92	57	149
yes, about twice a week.	38	46	84	24	12	36	44	41	85	15	19	34	121	118	239
yes, about three or four times a week.	12	32	44	11	18	29	16	28	44	9	4	13	48	82	130

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
6 (Continued)															
yes, more than four times a week.	5	4	9	5	3	8	11	8	19	1	0	1	22	15	37
7 Job in this town or another town.															
the job in this town.	82	77	159	35	29	64	113	97	210	51	27	78	281	230	511
the job in another town.	46	50	96	39	25	64	64	54	118	22	28	50	171	157	328
8 Job in this town or a larger city.															
the job in this town.	60	59	119	28	15	43	96	61	157	44	13	57	228	148	376
the job in a larger city.	69	68	137	45	39	84	81	89	170	29	42	71	224	238	462
9a Relative desirability of occupations (mean ranks from 1-5).															
writer or journalist.	4.2	4.1	4.2	3.9	3.8	3.8	4.3	4.3	4.3	4.4	4.2	4.3	4.2	4.1	4.2
scientist.	2.8	3.3	3.0	3.1	3.5	3.3	3.1	3.4	3.2	2.6	3.6	3.1	2.9	3.4	3.1
business executive.	2.7	2.5	2.6	2.2	2.4	2.3	2.6	2.4	2.5	2.7	2.7	2.7	2.6	2.5	2.5
medical doctor.	2.5	2.1	2.3	2.9	2.1	2.6	2.7	2.2	2.5	3.2	2.3	2.8	2.7	2.1	2.5
chemical engineer.	2.8	3.0	2.9	3.0	3.2	3.0	2.3	2.8	2.5	2.1	2.3	2.2	2.5	2.8	2.7
9b Relative desirability... (first choices)															
writer or journalist.	13	7	20	8	5	13	12	5	17	1	3	4	34	20	54
scientist.	23	10	33	10	4	14	19	10	29	14	4	18	66	28	94
business executive.	38	39	77	32	21	53	57	44	101	20	9	29	147	113	260
medical doctor.	30	41	71	16	17	33	31	44	75	9	19	28	86	121	207
chemical engineer.	21	18	39	7	4	11	53	26	79	26	15	41	107	63	170

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
10 Which would you most want to be?															
BOYS:															
jet pilot	31			26			62			28			147		
nationally famous athlete	48			19			54			18			139		
missionary	14			10			13			2			39		
atomic scientist	33			19			46			23			121		
GIRLS:															
actress or artist		22			4			17			15			58	
nurse		33			0			32			15			80	
model		42			24			54			13			133	
school teacher		28			26			45			12			111	
11a Rank occupations in terms of their desirability. (mean ranks 1-4).															
BOYS:															
sales manager for a large business	1.7			1.7			2.0			2.2			1.9		
trained machinist	2.5			2.6			2.3			2.0			2.4		
proprietor of a small store	3.0			3.0			2.8			2.8			2.9		
owner-operator of a printing shop	2.9			2.7			2.9			3.0			2.9		
GIRLS:															
secretary to a business executive		2.0			2.1			2.0			2.0			2.0	
journalist		3.2			3.3			3.3			3.1			3.2	
interior decorator		2.3			2.3			2.3			2.6			2.3	
airline hostess		2.5			2.4			2.4			2.3			2.4	

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
11b Rank occupations... (first choices)															
BOYS:															
sales manager for a large business	72			41			73			18			204		
trained machinist	25			13			51			37			126		
proprietor of a small store	11			5			22			5			43		
owner-operator of a printing shop	16			11			19			8			54		
GIRLS:															
secretary to a business executive		50			21			67			21			159	
journalist		10			5			13			6			34	
interior decorator		33			13			31			7			84	
airline hostess		25			14			35			14			88	
12a Relative importance on a job. (mean ranks from 1-6).															
the security of steady work.	3.0	3.0	3.0	3.1	3.4	3.2	3.0	2.8	2.9	2.9	3.1	3.0	3.0	2.9	3.0
the opportunity for a rapid rise.	4.0	4.8	4.4	3.6	4.9	4.1	4.3	4.9	4.6	4.3	4.7	4.5	4.1	4.8	4.4
the enjoyment of the work itself	2.5	1.8	2.1	2.9	1.6	2.4	2.1	2.1	2.1	2.2	1.9	2.1	2.4	1.9	2.1
the opportunity to be creative.	4.6	4.2	4.4	4.7	4.1	4.5	4.7	4.2	4.5	4.5	4.4	4.4	4.6	4.2	4.4
friendly people to work with	3.4	3.0	3.2	3.6	3.0	3.4	3.4	3.1	3.2	3.3	2.8	3.1	3.4	3.0	3.2
a high income.	3.5	4.3	3.9	3.1	4.0	3.5	3.6	4.0	3.8	3.7	4.1	3.9	3.5	4.1	3.8

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
12b Relative importance... (first choices)															
the security of steady work.	35	26	61	17	9	26	39	37	76	14	9	23	105	81	186
the opportunity for a rapid rise.	6	1	7	10	0	10	7	0	7	3	1	4	26	2	28
the enjoyment of the work itself.	56	77	133	21	31	52	83	73	156	35	34	69	195	215	410
the opportunity to be creative.	4	6	10	5	3	8	5	9	14	2	3	5	16	21	37
friendly people to work with.	10	7	17	7	5	12	12	12	24	8	3	11	37	27	64
a high income.	15	5	20	13	4	17	24	15	39	8	1	9	60	25	85
13 Choice location of college.															
away to college.	105	113	218	57	48	105	134	115	249	52	47	99	348	323	671
live at home.	21	14	35	18	5	23	41	36	77	21	8	29	101	63	164
14 Choice size of college.															
small college.	79	72	151	41	34	75	88	80	168	50	28	78	258	214	472
large college or university.	49	54	103	34	20	54	87	70	157	23	27	50	193	171	364
15 BOYS: Who would you rather go out with?															
cheerleader	33			12			47			17			109		
best student	13			9			24			9			55		
best looking	72			49			101			45			267		
16 GIRLS: Who would you rather go out with?															
star athlete		26			20			38			11			95	
best student		59			13			41			15			128	
best looking		36			16			70			28			150	

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
17 Which would you rather be remembered as?															
BOYS:															
brilliant student	59			26			63			32			180		
athletic star	34			16			50			22			122		
most popular	33			28			60			17			138		
GIRLS:															
brilliant student		59			16			43			26			144	
leader in activities		46			27			68			16			157	
most popular		20			9			40			12			81	
18 Desire to join club, parents disapprove: would you...															
definitely join anyway.	12	0	12	5	2	7	17	4	21	6	0	6	40	6	46
probably join.	42	20	62	29	17	46	64	43	107	20	8	28	155	88	243
probably not join.	61	81	142	32	26	58	70	80	150	38	36	74	201	223	424
definitely not join.	11	23	34	8	9	17	24	24	48	9	10	19	52	66	118
19 Desire to join club, teacher disapproves (parents approve) would you...															
definitely join anyway.	31	6	37	23	5	28	60	32	92	17	3	20	131	46	177
probably join.	64	57	121	35	31	66	92	86	178	38	38	76	229	212	441
probably not join.	32	59	91	17	15	32	20	31	51	16	13	29	85	118	203
definitely not join.	1	3	4	1	3	4	3	2	5	2	1	3	7	9	16
20 Desire to join club, parents and teachers approve; best friend disapproves. Would you...															

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
20 (Continued)															
definitely join anyway.	12	2	14	1	1	2	8	8	16	2	1	3	23	12	35
probably join.	29	31	60	16	8	24	49	42	91	16	18	34	110	99	209
probably not join.	53	61	114	28	36	64	83	80	163	43	26	69	207	203	410
definitely not join.	35	31	66	30	9	39	34	20	54	12	10	22	111	70	181
21a BOYS: How to be important and looked up to by the other fellows. (mean ranks 1-6)															
coming from the right family	5.1			4.8			5.3			5.4			5.2		
leader in activities	3.0			3.7			3.2			3.4			3.3		
having a nice car	4.4			5.3			4.3			4.6			4.5		
high grades, honor roll	4.6			4.4			5.2			4.9			4.9		
being an athletic star	3.1			3.4			3.2			3.1			3.2		
being in the leading crowd	3.3			2.6			2.7			2.7			2.8		
being popular with girls	4.7			3.9			4.1			4.0			4.1		
21b BOYS: (First choices)															
coming from the right family	5			0			10			6			21		
leader in activities	19			6			30			9			64		
having a nice car	5			1			12			1			19		
high grades, honor roll	2			4			11			2			19		
being an athletic star	13			4			35			14			66		
being in the leading crowd	7			18			42			17			84		
being popular with girls	1			2			6			3			12		
22a GIRLS: How to be important and looked up to by the other girls. (mean ranks 1-6)															

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
22a (Continued)															
coming from the right family		4.3			3.61			4.0			4.4			4.1	
leader in activities		3.4			3.45			3.4			3.9			3.5	
having a good reputation		3.7			3.52			3.3			3.7			3.5	
high grades, honor roll		4.6			5.18			5.4			5.3			5.2	
good looks		4.1			4.70			4.3			4.4			4.3	
being in the leading crowd		3.2			3.27			3.3			2.3			3.1	
being popular with boys		4.7			4.27			4.3			4.1			4.4	
22b GIRLS: (First choices)															
coming from the right family		7			5			19			5			36	
leader in activities		11			3			19			4			37	
having a good reputation		21			15			51			13			100	
high grades, honor roll		2			1			3			1			7	
good looks		5			1			6			5			17	
being in the leading crowd		17			7			28			17			69	
being popular with boys		2			1			8			3			14	
23a BOYS: Most important in making a fellow popular with the girls. (mean ranks 1-6)															
coming from the right family	4.3			4.5			4.3			4.3			4.3		
leader in activities	3.1			3.0			3.2			3.3			3.2		
having a nice car	3.8			4.2			3.3			3.5			3.6		
high grades, honor roll	4.2			4.3			4.8			4.7			4.6		
being an athletic star	2.7			2.4			2.6			2.4			2.6		
being in the leading crowd	2.9			2.6			2.8			2.8			2.8		

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
23b BOYS: (First choices)															
coming from the right family	13			0			16			9			38		
leader in activities	23			12			24			8			67		
having a nice car	9			4			30			4			47		
high grades, honor roll	8			3			7			1			19		
being an athletic star	29			25			56			25			135		
being in the leading crowd	24			20			33			17			94		
24a GIRLS: Important in making a girl popular with the boys. (mean ranks 1-6).															
coming from the right family		4.7			3.9			4.8			4.3			4.2	
leader in activities		3.5			3.5			3.6			3.7			3.6	
having a good reputation		3.0			3.3			3.0			3.1			3.1	
high grades, honor roll		4.7			5.3			5.2			5.3			5.1	
good looks		2.2			2.2			2.3			2.2			2.3	
being in the leading crowd		2.9			2.8			2.9			2.4			2.8	
24b GIRLS: (First choices)															
coming from the right family		1			2			11			2			16	
leader in activities		4			3			5			2			14	
having a good reputation		37			14			48			14			113	
high grades, honor roll		3			0			0			1			4	
good looks		43			20			47			14			124	
being in the leading crowd		25			12			28			15			80	
25a Rank in terms of their attractiveness for men (average means 1-4).															
an executive in a large national corporation	2.1	2.2	2.1	1.7	1.9	1.7	2.0	2.2	2.1	1.7	1.9	1.8	1.9	2.1	2.0

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
25a (Continued)															
a respected leader in civic and political affairs in the community.	2.8	2.6	2.7	2.8	2.5	2.7	2.9	2.6	2.7	2.9	2.8	2.9	2.9	2.6	2.8
a statesman in the affairs of the nation.	2.7	2.7	2.7	2.8	2.9	2.8	2.6	2.8	2.7	2.9	2.9	2.9	2.7	2.8	2.7
a successful businessman in the community.	2.4	2.5	2.4	2.7	2.8	2.7	2.6	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.5
25b Rank in terms... (First choices)															
an executive in a large national corporation.	41	39	80	36	26	62	67	42	109	35	23	58	179	130	309
a respected leader in civics and political affairs in the community.	16	18	34	4	7	10	20	25	45	5	4	9	45	54	99
a statesman in the affairs of the nation.	26	28	54	16	8	23	42	37	79	11	6	17	95	79	174
a successful businessman in the community.	32	29	61	16	11	27	44	37	81	17	13	30	109	90	199
26 A person who is alone is...															
bored or unhappy.	21	11	32	16	7	23	36	36	72	16	15	31	89	69	158
lonely.	54	55	109	24	23	47	72	62	134	25	22	47	175	162	337
afraid.	1	6	7	4	3	7	3	3	6	3	0	3	11	12	23
better off.	7	6	13	5	0	5	7	3	10	4	0	4	23	9	32
relaxed, thinking, or reading.	34	46	80	19	17	36	46	39	85	21	17	38	120	119	239
happy.	4	2	6	4	2	6	7	2	9	2	0	2	16	6	23
27 How far from the center of activities are you?															

General Information Items	Community A			Community B			Community C			Community D			Population Totals		HTRP
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Respondents (N)	130	125	255	76	54	130	175	150	325	73	55	128	454	384	838
27 (Continued)															
first circle (center).	14	10	24	12	13	25	12	17	29	6	8	14	44	49	93
second circle.	31	28	59	9	8	17	43	37	80	11	15	26	94	87	181
third circle.	42	48	90	24	18	42	57	51	108	39	12	51	162	129	291
fourth circle.	25	29	54	14	10	24	34	33	67	5	13	18	78	85	163
fifth circle.	17	11	28	13	2	15	29	11	40	12	7	19	71	31	102
28 Where would you like to be?															
first circle (center).	30	28	58	20	19	39	56	45	101	20	16	36	126	108	234
second circle.	46	43	89	30	16	46	51	66	117	16	22	38	143	147	290
third circle.	30	36	66	8	10	18	37	27	64	27	7	34	102	80	182
fourth circle.	9	12	21	2	4	6	14	3	17	5	4	9	30	23	53
fifth circle.	13	7	20	9	2	11	14	9	23	5	6	11	41	24	65

ticipating since the seventh-grade year of the original HTRP population, 1957-58 (McGuire & Associates, 1960). The table not only sets forth the stimulus items and enumeration data for boys and girls in the senior classes of the high schools in four relatively small Texas cities but also reports mean ranks and first choices regarding the relative importance of items reflecting the attitudes and value systems of members of the HTRP population who had remained in school until their year of graduation. Thus the primary data are in a summary form which can be employed in any subsequent comparative study of adolescent value-attitudes. Moreover, frequency counts for subpopulations can be recaptured since the responses are punched on IBM cards which bear identifying data and relevant "marker variables."

The next two tables were constructed to show comparisons between the Coleman data gathered in the latter 1950's and HTRP data gathered in the early 1960's during a time when a change in zeitgeist apparently was taking place. Table A.41 has to do with preferred high school image. Clearly, in Table A.41, Coleman's boys prefer to be remembered as an athletic star whereas the HTRP males preferred to be remembered as brilliant students. In the case of girls, the emphasis in the Coleman study was upon being a leader in activities or most popular. On the other hand, among the HTRP girls there was a significant increase over Coleman's data in the proportion wishing to be recalled as brilliant students and a much lower proportion desiring to be most popular.

Table A.42 has to do with the career preferences of girls and boys, comparing the Coleman data of spring 1958 with the HTRP data of spring 1963. There are no significant differences among the two studies in male preferences of jet pilot, famous athletes and atomic scientists. On the other hand, the HTRP boys indicate a significantly larger preference for the "missionary" category, possible as a consequence of the development of the peace corps. Among girls, there are no significant differences for "Actress or Artist," "Nurse," and "Model." The proportion in the HTRP population preferring to be a "School Teacher" is significantly larger than in the Coleman study, probably a concomitant of the increasing emphasis being placed upon intellectual achievement. Another factor may be the increase in salaries of women holding positions in schools and colleges and their increasing respect acquired by persons in the educational professions.

The data tend to show that studies of adolescent value-attitudes have to be carried out with a clear understanding of the spirit of the times and that periodic inquiries are necessary to bring literature upon the expectations and value standards of young people up to date.

TABLE A.41

Preferred High School Image (To Be Remembered Here) Selected by Boys and Girls in the Coleman and HTRP Populations expressed in Percentages with Chi Square Values Derived from Contingency Tables

Preferred High School Image	Boys			Girls		
	Coleman	HTRP	ΣX^2	Coleman	HTRP	ΣX^2
	%	%		%	%	
Brilliant Student	31.5	40.9	10.71**	27.9	37.7	11.53**
Athletic Star	45.1	27.7	27.23**			
Leader in Activities				37.8	41.1	.90
Most Popular	23.4	31.4	10.05**	34.2	21.1	17.64**
Number Responding	(3,690)	(440)	(4,130)	(3,876)	(382)	
Sum Chi Square (ΣX^2)			41.99			30.97
Probability (P)			.001			.001

**Significant at .01 level (actually .001 in every instance).

NOTE. - The Coleman data (1961, p. 30) were from students in all grades of nine Illinois high schools (adolescent cultures) obtained in the spring of 1958; and the HTRP data are the responses of seniors of four Texas high school age-mate societies in the spring of 1963 to the items of instruments employed in the "Study of High School Social Climates" (Coleman, 1961, Appendix 2).

TABLE A.42

Career Preferences ("What Would You Most Want To Be") of Boys and Girls in the Coleman and HTRP Populations Expressed in Percentages with Chi Square Values Derived from Contingency Tables.

Career Preferences	Adolescent Populations		ΣX^2	ΣX^2
	Coleman Spring 1958	HTRP Spring 1963	Career	Sex Role
Boys (Number Responding)	(3,746)	(446)		
	%	%		
Jet Pilot	31.3	33.0	0.39	
Famous Athlete	36.9	31.2	3.64	
Missionary	5.9	8.7	18.98**	
Atomic Scientist	25.9	27.1	0.23	23.24**
Girls (Number Responding)	(3,922)	(382)		
Actress or Artist	19.2	15.2	2.98	
Nurse	26.0	20.9	3.62	
Model	33.5	34.8	0.12	
School Teacher	20.6	29.0	11.25**	17.97**

**Significant at .01 level (actually .001 in every designated instance).

NOTE. - The Coleman data (1961, pp. 27-28) were from students in the four grades of nine Illinois High Schools (regarded as adolescent cultures). The HTRP entries are based upon the responses of seniors in four Texas high schools (regarded as age-mate societies) derived from enumeration data in Table 4.1, Item 10 (McGuire & Associates, 1947--or Table A to be deposited with the American Documentation Institute of the Library of Congress.

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APPENDIX B

METHODOLOGY

One of the most difficult decisions a researcher has to make concerns the relative importance which should be placed on methodology in the discussions of his conclusions. On the one hand, too much discussion of methodology tends to fragment and separate the conclusions. On the other hand, too little discussion tends to cast doubt on the validity of the inferences made from the analyses of data. In the preparation of this report a compromise was made whereby the discussion of results and statistical inferences would depend, in so far as possible, on very little knowledge of the methodology. This appendix describes briefly and gives references for the major methodologies used in this report.

Multiple Regression Models

The concept of variability in the behavior of the human organism is well understood at an intuitive level. No one is surprised to see individuals react differently to environmental stimuli. Most research problems at some level are concerned with "accounting for" or "explaining" this variability by showing that, over and above individual and/or intraindividual differences (from one time to another) as well as errors of measurement, there is some probability of "lawful" regularity or recurrence.

The multiple linear regression technique is ideally suited for this type of problem (Bottenberg & Ward, 1963). A multiple linear regression equation has the following form:

$$Y = a_1X_1 + a_2X_2 + \ldots + a_kX_k + E$$

where

Y is a vector of known numbers (usually called the criterion or dependent variable). For purposes of illustration, let us assume that Y contains N numbers.

$X_1, X_2, \ldots X_k$ are vectors of known numbers (usually called predictor or independent variables). Each X also contains N numbers.

$a_1, a_2, \ldots a_k$ are unknown coefficients (i.e., partial regression weights to be estimated by least square procedures).

E is a vector of N unknown numbers (usually called error or residual).

This equation, of course, could be solved by assigning arbitrary values to the a's and computing the values of E by subtraction. In general, however, the a's are solved for in such a fashion as to make the sum of the squared E values (error sum of squares, ESS) as small as possible in which case the a's are said to be least square weights.

Once this equation has been solved, the solution may be used to obtain predicted values for individuals who are characterized by the values in the X vectors. Within this report all of the prediction equations were determined in this fashion.

For purposes of hypothesis testing, it is possible to impose restrictions on the a's which result in a reduced model[1], the error sum of squares of which is either equal to or greater than the ESS in the unrestricted model. Within the report, for example, a number of questions were asked about the independent contribution of a predictor. Consider the model where an effort is being made to predict grade point average from knowledge of a measure of mental ability, a measure of symbol aptitude, and a measure of scholastic motivation. Each of these measures have been obtained on N persons. The full or unrestricted model would have the following form

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[1] In general, the multiple correlation squared (R^2) for the _full_ or unrestricted model is compared by means of an F ratio (described later) with the R^2 obtained for the _reduced_ or restricted model. In certain instances, however, the most effective strategy is to start with a _conditional_ model having the basic terms to be considered (as in Ch. 4 of No. 742) and to make the comparisons with an _elaborated_ model.

$$Y = a_0U + a_1Q + a_2S + a_3M + E_1$$

where

Y is the vector containing N grade point averages.

U is a vector containing N ones.

Q is a vector containing mental ability test scores suitably arranged. The term "suitably arranged" is used to mean that the elements are arranged within a vector so that if the $i^{\underline{th}}$ element of Y is the criterion observation on a certain individual, then the $i^{\underline{th}}$ element of the vector being defined is a value obtained by or associated with that same individual.

S is a vector containing N symbol aptitude scores suitably arranged.

M is a vector containing N motivation scores suitably arranged.

a_0, a_1, a_2, and a_3 are unknown coefficients.

E_1 is the error vector.

Assume that this equation has been solved and the least squares weights obtained. If it is true that the motivation score is not contributing to the prediction of Y, then two individuals who have the same scores on Q and S but different scores on M should have the same predicted grade point average. Suppose that person A had scores of 110, 40, and 60 and that person B had scores of 110, 40, and 70. Our hypothesis then states that

$$a_0 + a_1 (110) + a_2 (40) + a_3 (60) = a_0 + a_1 (110) + a_2 (40) + a_3 (70)$$

which reduces to

$$a_3 (60) = a_3 (70).$$

The only condition under which this can be true is when $a_3 = 0$. The foregoing can be generalized to any values on the tests so long as the two individuals have the same Q and S scores but different M scores.

It now becomes possible to impose the restriction

$$a_3 = 0$$

on the full or unrestricted model which yields

$$Y = a_0 U + a_1 Q + a_2 S + E_2.$$

In this restricted model, all symbols have the same definition as before. The reader should recognize that solving this equation may result in different values for the a's and that E_2 values may be different from E_1 values. From the two models it is possible to compute ESS_1 and ESS_2. Under certain assumptions it can be shown that the ratio

$$\frac{(ESS_2 - ESS_1)/df_1}{ESS_1/df_2}$$

is distributed as the F statistic with df_1 and df_2 degrees of freedom where df_1 is defined as being the difference between the number of unknown parameters (coefficients) in the full model and the number of unknown parameters in the restricted model (in this problem 4-3 = 1); and df_2 is defined as being N minus the number of unknown parameters in the full model (in this problem df_2 = N-4). A more detailed description of the theory and assumptions along with problem formulation procedures and computing formulas can be found in Bottenberg and Ward (1964), Mann (1949), Graybill (1961), and Scheffe (1959). A recent account with examples has been provided by Veldman (1967, 281-207).

Analysis of Covariance Models

One of the most valuable uses that can be made of regression models is in the area of statistical control of contaminating variables in situations where it is impossible to control such variables experimentally. In fact, there is good reason to introduce statistical control even when experimental control is possible. The purpose of this section is to describe in detail the rationale and procedure used in a typical covariance-type problem by means of an example. The logic described can be extended to a greater number of groups and more than one contaminating variable.

The problem under examination here has to do with evaluating the effect of an experimental teaching procedure with respect to a criterion of achievement. Specifically the purpose is to determine if the experimental procedure can be recommended over a more conventional method of teaching. Consider Figure B.01 which has been constructed to represent a plot of the obtained scores of individuals on a pretest and a posttest of achievement under the two teaching conditions. The x's represent scores obtained by individuals taught by the experimental method and the o's represent scores obtained by individuals taught by conventional methods.

The approximate average performance of each group is shown by broken lines for the pretest and by solid lines for the posttest. From the diagram one would infer that the average performance of the experimental group was superior to the control group on the posttest. Without considering the pretest one would conclude that the experimental treatment did, in fact, produce a beneficial effect. An examination of Figure B.01, however, reveals that the individuals in the experimental group were performing better on this particular measure of achievement before they were even exposed to the experimental treatment. This is the sense in which a variable may be said to contaminate conclusions with respect to treatment effects. Frequently

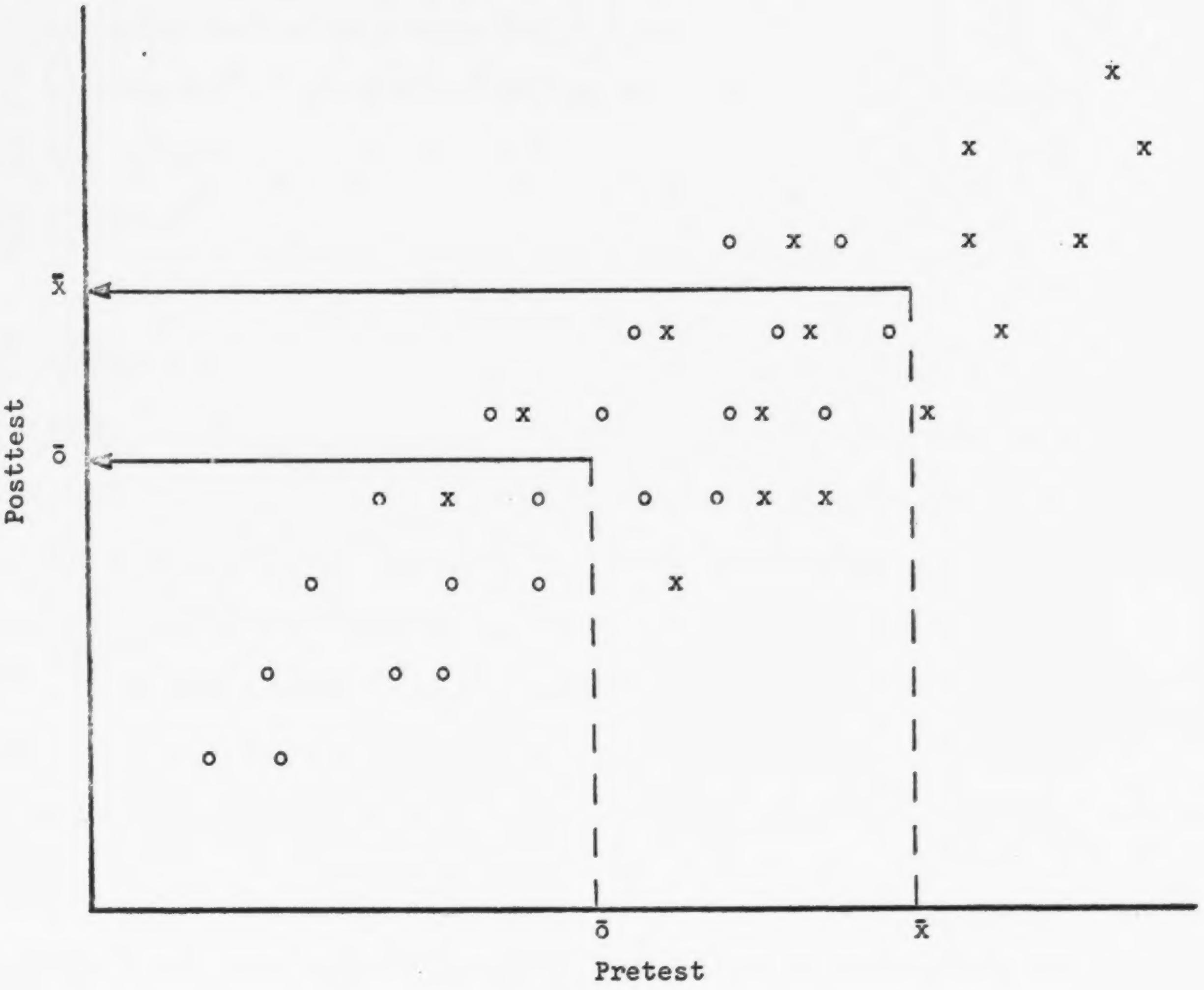

Figure B.01

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an effort is made to control this contamination experimentally by matching subjects on the pretest (or contaminating variable) or at least taking steps to insure that the average performance of the groups is equal. In many practical situations one is forced to accept his experimental material as he finds it which means that experimental control is often impossible or impractical.

The regression procedure used to "take out the effect" of the contaminating variable is to fit a separate regression line to the points of each group.

A number of possible outcomes are shown diagrammatically in Figures B.02, B.03, and B.04.

In Figure B.02 the vertical line up to the common regression line and horizontally over to the vertical axis indicates the predicted posttest value for members of both groups with a common pretest value. Obviously, there is no expected difference between the members of the two groups who have the same pretest performance.

Figure B.03 reveals a situation in which there is an expected difference between members of the two groups with common pretest scores. Notice that the expected difference is the same regardless of the pretest value chosen.

In Figure B.04 one can see the major reason why it is advisable to introduce statistical control whether or not the subjects were matched. Nevertheless, it is not possible to recommend one teaching procedure over another throughout the range of pretest values. Individuals on the lower end of the pretest scale had higher posttest scores when taught by conventional methods. Those individuals who had pretest scores on the higher end of the scale had higher posttest scores when taught by the experimental procedure.

One point concerning the situation portrayed in Figure B.04 should be noted because it is frequently misunderstood. Many times when an investigator determines

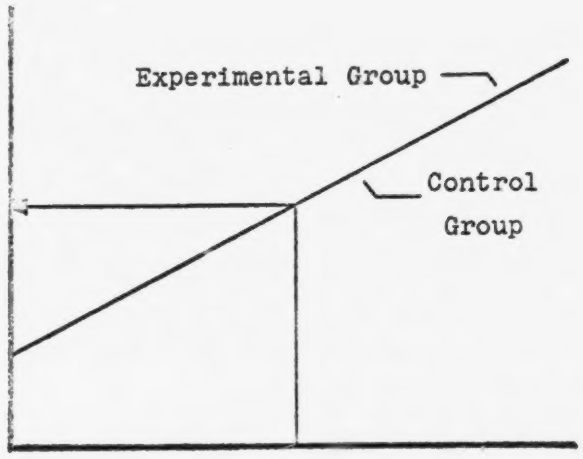

Experimental Group
Control
Group

Figure B.02. Collinear Regression Lines

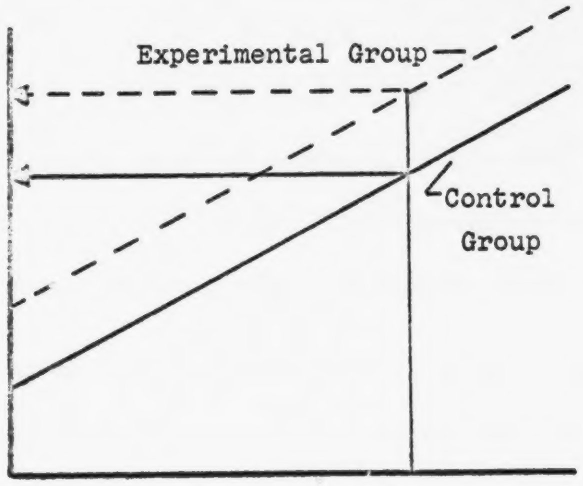

Experimental Group
Control
Group

Figure B.03. Parallel-Noncollinear Regression Lines

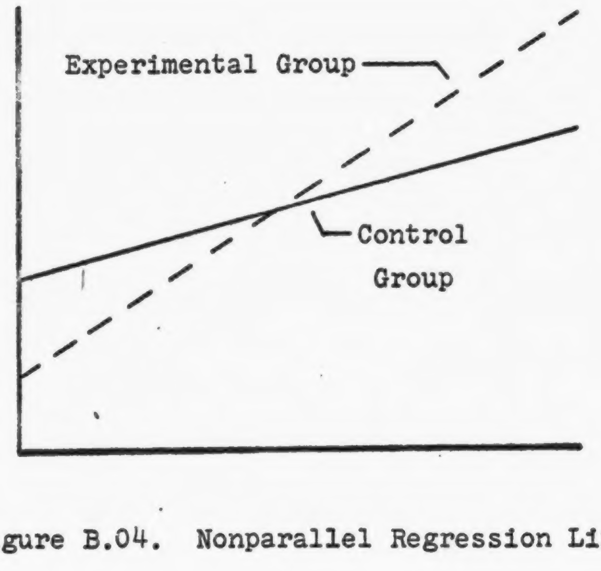

Experimental Group
Control
Group

Figure B.04. Nonparallel Regression Lines

that the regression lines cannot reasonably be regarded as parallel he concludes that no recommendations can be made. It is possible, however, to estimate the point at which the regression lines cross and, particularly when that point lies outside the range of interest, it is reasonable to recommend that treatment which is most effective over the range of interest.

Analytically, as to which of the possible outcomes portrayed in Figures B.02, B.03, and B.04 holds for a given set of data, the decision may be determined by generating a series of regression models and comparing the error terms. The vectors and coefficients of the regression models in this section are listed and defined as follows.

Y = a vector containing $n_e + n_c$ posttest scores where there were n_e individuals in the experimental group and n_c individuals in the control group.

U = a vector containing $n_e + n_c$ ones.

P = a vector containing $n_e + n_c$ pretest scores suitably arranged.

X = a vector containing n_e ones representing membership in the experimental (extra) group and n_c zeros.

C = a vector containing n_c ones representing membership in the control (c) group and n_e zeros.

$P^{(x)}$ = a vector containing the pretest scores of individuals in the experimental group suitably arranged; zero otherwise.

$P^{(c)}$ = a vector containing the pretest scores of individuals in the control group suitably arranged; zero otherwise.

a_1, a_2, a_3, and a_4 are unknown coefficients.

E = error vector.

Consider Model 1

[1] $$Y = a_1X + a_2C + a_3P^{(x)} + a_4P^{(c)} + E_1.$$

A solution of this model for the unknown a's to minimize the values in the residual vector, E, yields a prediction equation whereby it is possible to obtain the predicted value for a member of either group with a specified pretest score. It is important to recognize that in this model the predicted value for a member of the experimental group is dependent on his pretest score and the weights a_1 and a_3; but not on the weights a_2 and a_4 because vectors C and $P^{(c)}$ contain zeroes as elements where the corresponding element in Y was attained by a member of the experimental group. Similarly the predicted value for a member of the control group does not depend upon a_1 and a_3.

In order to determine whether or not one method can be recommended over another throughout the range of the pretest it is necessary to determine if it is reasonable to believe that the expected difference between the two groups is constant at all pretest values.

An examination of Figures B.03 and B.04 reveals that the difference is constant when the regression lines are parallel (as in Fig. B.03) but depends on the pretest when the regression lines are not parallel (as in B.04). The only condition under which the regression lines are parallel is if $a_3 = a_4$. The restriction that a_3 and a_4 be equal to some common value, let us say b_1, imposed on Model 1 yields Model 2

[2] $$Y = a_1X + a_2C + b_1P + E_2$$

where E_2 is the residual or error vector. The increase (if any) in the error sum of squares can be tested by means of the F ratio. If it appears reasonable to accept the hypothesis that the slopes are equal (i.e., $a_3 = a_4$) then it becomes appropriate to determine whether or not the difference between the two lines is zero. Using the same logic as before, the foregoing statement reduces to the restriction

$$a_1 = a_2 = \text{a common value, } d_1 .$$

Imposing this restriction on Model 2 yields Model 3

$$[3] \qquad Y = d_1U + b_1P + E_3$$

where E_3 is the residual vector. The error sum of squares for Model 3 can be compared to that of Model 2 by employing the F ratio as the basis for deciding whether or not to recommend one method over another.

Detection of "Catalytic" Effects Through Regression Models

One of the most fruitful findings in the study of human behavior has been the discovery that the measurement of a certain attribute is related to other measurements in a fashion so that changes in the latter are associated with a change in the former. For example, within the report, CTMM (C) and STEP Listening (S) were used as predictors of Grade Point Average (G) in the following regression model:

$$G = a_0 U + a_1 C + a_2 S + E_1$$

which may be written in extended form as

$$\begin{bmatrix} g_1 \\ g_2 \\ . \\ . \\ . \\ g_n \end{bmatrix} = a_0 \begin{bmatrix} 1 \\ 1 \\ . \\ . \\ . \\ 1 \end{bmatrix} + a_1 \begin{bmatrix} c_1 \\ c_2 \\ . \\ . \\ . \\ c_n \end{bmatrix} + a_2 \begin{bmatrix} s_1 \\ s_2 \\ . \\ . \\ . \\ s_n \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ . \\ . \\ . \\ e_n \end{bmatrix}$$

The coefficients a_1 and a_2 associated with CTMM and STEP Listening were found to be nonzero and positive. Thus one would infer that the higher the person's CTMM and STEP Listening scores, the greater his expected Grade Point Average.

Further thought on the problem led us to believe that individuals with higher I.Q.'s should be able to utilize their Listening talents more effectively than individuals with lower I.Q.'s. If so, we can say that I.Q. operates as a "catalyst" or as an agent which moderates in some positive sense the utilization of Listening ability (Saunders, 1956). The foregoing implies that the difference between the expected Grade Point Averages for two individuals with the same high I.Q. score (say c_1) but different Listening scores (say s_1 and s_2) should be greater than the expected difference for two individuals with a lower I.Q. score (say c_2) with the Listening scores s_1 and s_2. Consider the algebraic statement of this notion in terms of the regression model. The difference for the first individuals is

$$(a_0 + a_1c_1 + a_2s_1) - (a_0 + a_1c_1 + a_2s_2) = a_2(s_1 - s_2).$$

Similarly, the difference for the second pair of individuals is

$$(a_0 + a_1c_2 + a_2s_1) - (a_0 + a_1c_2 + a_2s_2) = a_2(s_1 - s_2).$$

Obviously, the model as proposed will yield the same difference, $a_2(s_1 - s_2)$, regardless of the relationships existing among G, C, and S. Stated in another way, the amount of change in G associated with a fixed I.Q. score and a one unit change in S is a_2 regardless of which I.Q. score we choose. Therefore, we propose to modify the coefficient associated with S by adding to it some value which depends on the corresponding I.Q. value. For the $i^{\underline{th}}$ I.Q. value the element added can be expressed as a_3c_i.

$$G = a_0 \quad U \quad + a_1 \quad C \quad + \quad (a_2 + a_3 c_1)S \quad + \quad E_2$$

$$\begin{bmatrix} g_1 \\ g_2 \\ \cdot \\ \cdot \\ \cdot \\ g_n \end{bmatrix} = a_0 \begin{bmatrix} 1 \\ 1 \\ \cdot \\ \cdot \\ \cdot \\ 1 \end{bmatrix} + a_1 \begin{bmatrix} c_1 \\ c_2 \\ \cdot \\ \cdot \\ \cdot \\ c_n \end{bmatrix} + \begin{bmatrix} (a_2 + a_3 c_1) s_1 \\ (a_2 + a_3 c_2) s_2 \\ \cdot \\ \cdot \\ \cdot \\ (a_2 + a_3 c_n) s_n \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ \cdot \\ \cdot \\ \cdot \\ e_n \end{bmatrix}$$

The third vector expands to two vectors each with unknown coefficients and with the form

$$a_2 \quad S \quad + \quad a_3 \ (C S)$$

$$a_2 \begin{bmatrix} s_1 \\ s_2 \\ \cdot \\ \cdot \\ \cdot \\ s_n \end{bmatrix} + a_3 \begin{bmatrix} c_1 s_1 \\ c_2 s_2 \\ \cdot \\ \cdot \\ \cdot \\ c_n s_n \end{bmatrix} .$$

The appropriate model then becomes

$$G = a_0 U + a_1 C + a_2 S + a_3 (CS) + E_2$$

where the elements in the vector CS are simply the products of the corresponding elements in C and S. In this model the two differences referred to earlier reduce to

$$(a_2 + a_3 c_1) \quad (s_1 - s_2)$$

and

$$(a_2 + a_3c_2)\ (s_1 - s_2)\ .$$

The difference between these two differences depends upon the level of I.Q. chosen (c_1 and c_2). Notice that if $a_3 = 0$ then the two differences reduce to the earlier differences. Therefore, it is appropriate to test our hypothesis by imposing the restriction

$$a_3 = 0$$

on the model and comparing the error sum of squares by means of the F ratio previously described. Graphic representations of two of the three possible situations are shown in Figures B.05 and B.06.

Computational Aspects of Regression Analysis

Basically, the computations involved in regression analysis result in the solution of a system of simultaneous linear equations. As the number of unknown weights in the models increase, the greater is the need for a computer in the solution of the equations. A number of possible methods are available, all yielding essentially the same results. Differences in the solutions will be due to characteristics of the computer used (i.e., word size) and the proficiency of the programmer. Certain procedures which are said to be "exact" solutions will vary in their results due to round-off error. Moreover, "iterative" or "approximation" procedures are available which will vary somewhat from exact solutions.

It can be shown that there is a direct inverse relationship between the magnitude of the "error sum of squares" and the squared multiple correlation coefficient (R^2) when a vector containing all ones is in the model or is linearly dependent upon a set of vectors in the model. For example, Model 1 in the covariance section contained E and C which sum to a vector containing all ones. The procedure used in

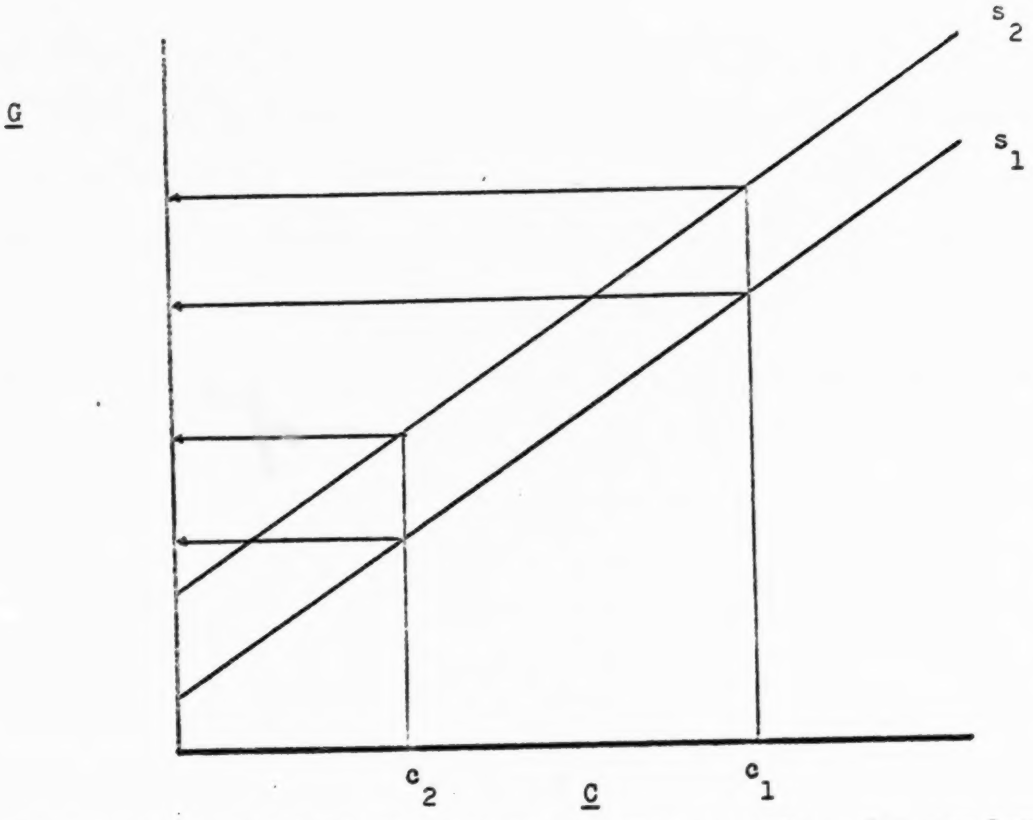


Figure B.05. Constant differences between s_2 and s_1 for any level of C.

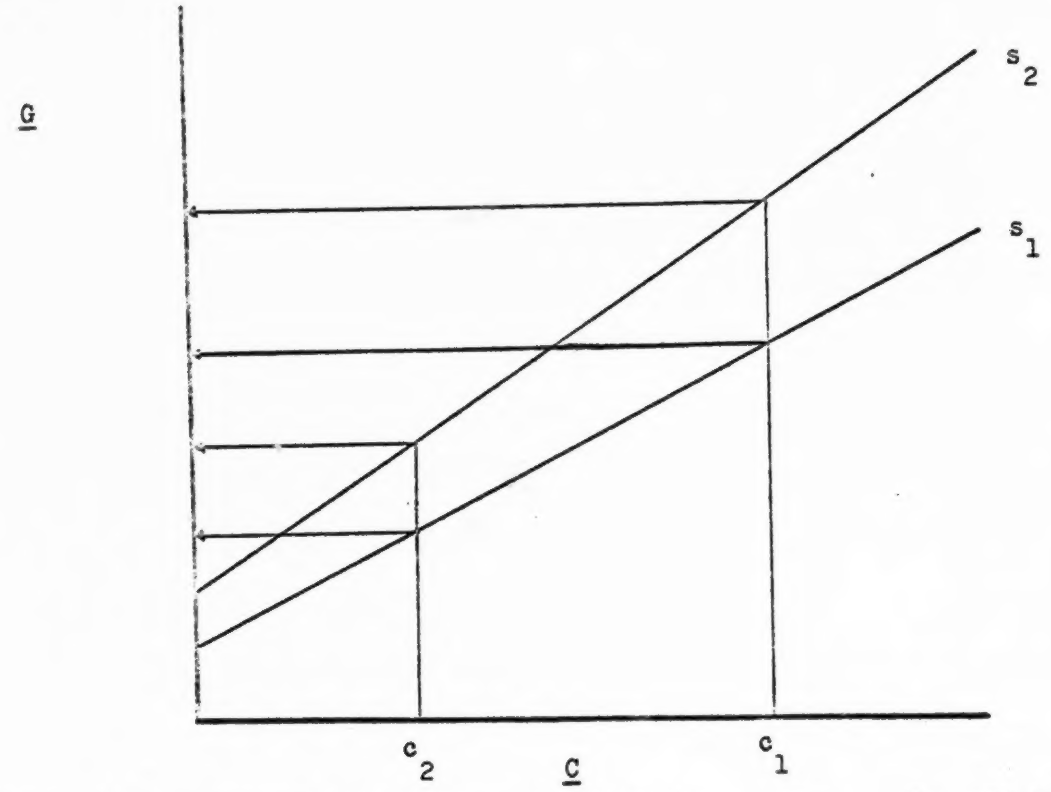


Figure B.06. Nonconstant differences between s_2 and s_1 for all levels of C.

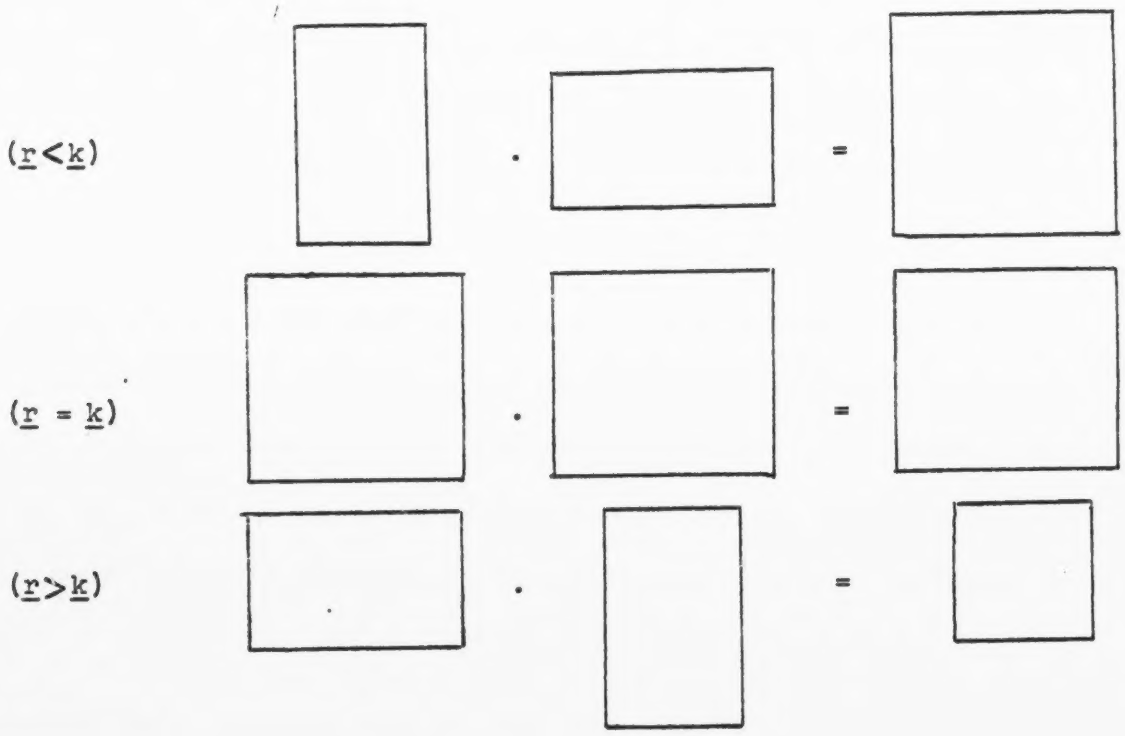
the solution of the regression models in this report was iterative in nature and operated in such a fashion as to modify the coefficients (which were initially set at zero) away from zero so as to maximize R^2 at each iteration (which is equivalent to minimizing tee error sum of squares). It should be noted that a number of typical multiple correlation programs will not yield a solution to regression models when binary-coded vectors representing mutually exclusive groups are a part of the model. Because of the relationship between ESS and R^2 it is possible to compute F by the formula

$$F = \frac{(R^2_{full} - R^2_{restricted}) / df_1}{(1 - R^2_{full}) / df_2}$$

where df_1 and df_2 have the same previously noted definitions (p. B-4). Within this report all of the statistical tests involving regression models were obtained by the formula just given.

Factor Analysis

Factor analysis is another methodology which was used extensively in this report. The logic for using factor analysis can be understood by examining some concepts in scalar and matrix multiplication. A number such as "9", for example, can be factored into two parts, "3" and "3," and we can say that the number "3" is a factor of the number "9." In the process of "factoring" the number "9" we can say that we are seeking a number which when multiplied by itself yields "9." In matrix algebra it is well known that the product of a $\underline{k} \times \underline{r}$ matrix and an $\underline{r} \times \underline{k}$ matrix yields a $\underline{k} \times \underline{k}$ matrix as shown in the representations which follow.



Given a correlation matrix of k rows and k columns, factor analysis seeks another matrix with k rows and some number of columns (r) such that multiplication by its transpose will yield the correlation matrix. The aim is to find this matrix with r less than k. With actual data it is quite rare to find such a matrix but it is possible, in general, to find a matrix which will "almost" reproduce the correlation matrix. For example, let

R be a $k \times k$ correlation matrix, and

F be a $k \times r$ matrix of factor loadings,

Then, in factor analysis, we seek a solution such that the Matrix F will have r as small as possible so as to produce

$$D = R - FF'$$

where the values in D are as small as possible. In the case of $r = k$ the values of D will be zero. In general the greater the difference between r and k the larger the values in D become. The value of $\underline{r}$ or the number of factors to retain is arbitrary but there are some decision rules based on theory and experience which can be used. The general practice used in this report was to retain all factors which had associated eigen values of 1.0 or greater.

The computational procedure for obtaining the F matrix involves solving for the eigen values and eigen vectors of the matrix R. As with regression analysis, there are a number of procedures available. The procedure used for this report was an iterative method which produced the eigen values one at a time in descending order of magnitude. In general, iteration ceased when an eigen value less than 1.0 was obtained (Veldman, 1967, pp. 206-221).

There were two purposes for using factor analysis. The procedure allowed us to identify "categories" of test behavior which were statistically independent of one another. The values in the F matrix are simply correlations so that the $ij^{\underline{th}}$ element of F is the correlation between the $i^{\underline{th}}$ variable and another variable (a factor variable) which can be generated from the values in the $j^{\underline{th}}$ column of F. The factor variables have zero intercorrelations and in this sense are statistically independent. One of the purposes was, therefore, to reduce the number of variables to a more manageable set. Another purpose was to determine if information in a factor variable form was more useful in prediction and more stable over time than the original variables.

The factor scores were computed as follows.

Let: X be a matrix of known raw scores with $\underline{n}$ rows and $\underline{k}$ columns where x_{ij} is the score attained by the $i^{\underline{th}}$ person on the $j^{\underline{th}}$ test;

P be a matrix of unknown factor scores with $\underline{n}$ rows and $\underline{r}$ columns where p_{ij} is the factor score of the $i^{\underline{th}}$ person on the $j^{\underline{th}}$ factor variable; and

S be a k x k digaonal matrix containing the standard deviations of the original variables.

Then: $b = R^{-1}F$

$B = S^{-1}b$

$P = XB.$

Methods in Crossvalidation

One of the primary purposes in using regression analysis in prediction equations is to obtain a set of weights which can be used in the future or in other samples. If the set of variables used in obtaining the weights is an adequate one, then applying these weights to the predictors in a new sample should produce predicted values that are fairly close to actual values. One way of determining just how close the actual values are to be predicted values is to compute the correlation between them. Rather than actually computing individual predicted values, however, it is possible to compute the correlation by

$$R = \frac{B'_1 V_2}{\sqrt{B'_1 R_2 B_1}}$$

where B'_1 is the transpose of a vector of standard partial regression weights from the first sample, B_1 is a vector of standard partial regression weights from the first sample, R_2 is the intercorrelation matrix of the predictors in the second sample, and V_2 is the vector of intercorrelations among the predictors and criterion in the second sample.

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APPENDIX C

ABSTRACTS OF DISSERTATIONS BY HTRP STAFF MEMBERS

Within the period during which they were serving as members of the HTRP team, a number of graduate students not only completed internships or apprenticeships in research affiliated with the Laboratory of Human Behavior, but also they completed doctoral dissertations with faculty members in the HTRP group as their supervising professors. The official dissertation abstracts are reprinted in Appendix C together with the "Publication Number" assigned by University Microfilms, Ann Arbor, Michigan, so that those interested may write to obtain microphotographs of the original dissertations.

AUTHORITARIANISM IN EARLY ADOLESCENCE

(Publication No. 64-8006)

Garrett R. Foster, Ph.D.
The University of Texas, 1963

Supervising Professor: Carson McGuire

This dissertation is a longitudinal investigation of developmental consequences during early adolescence of a set to accept authoritarian control for oneself (authoritarian submission) and for others (authoritarian aggression), as measured by the Authoritarian Discipline scale of a Cooperative Youth Study (CYS) instrument (Moore and Holtzman, 1955, Hogg Foundation, The University of Texas). The central contention of the dissertation is that a personal maladjustment syndrome is manifested by "authoritarian" adolescents, and that this syndrome is in part a function of their failure to conform to the peer culture during the early adolescent years. Non-conformity to the peer culture among authoritarian adolescents was hypothesized to be a function of (1) parental restrictiveness, (2) low ego strength, (3) resentful dependency, and (4) incorporation of (authoritarian) parents' negative attitudes towards sub-adult or "juvenile" behavior.

The confluence of non-conformity and a set to accept authoritarian control was hypothesized to result in increased peer rejection during early adolescents and a consequent maladjustment syndrome centering around increased feelings of social inadequacy accompanied by increased feelings of hostility and anxiety. In order to test these hypotheses, peer nominations and self-report data available in grades seven and nine for 288 boys and 288 girls in four central Texas communities were subjected to multiple linear regression analyses.

The results consistently support the hypothesized manifestations of a maladjustment syndrome among authoritarian adolescents (i.e., adolescents who score high on CYS Authoritarian Discipline). For girls, CYS Authoritarian Discipline was found to be related at a probability level well above .001 to relative increases in hostility toward the peer group (CYS Criticism of Youth) and generalized hostility toward society (CYS Negative Orientation to Society). Significant relationships between CYS Authoritarian Discipline and increases in CYS Social Inadequacy, Casteneda-McCandless Manifest Anxiety, Child's Autonomy Anxiety, and CYS Personal Maladjustment were also found.

271

Increased peer rejection appears to be a factor in the manifestation of the above-described syndrome, in that authoritarian girls evidenced increases in peer nominations for "Negative Behavior Model" and "Left Out." No support was found, however, for the hypothesis that rejection of authoritarian girls is based on rigid conformity to adult rather than peer group standards, for the authoritarian girls were not perceived by their peers as being more "Adult Oriented" or less autonomous in their behavior (Nominations "Has Initiative" and "Lacks Initiative").

A slight but statstically significant tendency towards nonconformity among authoritarian girls was found to be functionally dependent on CYS measures relating to parental restrictiveness, low ego strength, resentful dependency, and negative attitudes towards adolescent behavior standards. Contrary to expectations, however, the data indicate that, among girls who score at either extreme of the CYS Authoritarian Discipline, those who conform most highly to the pre-adolescent peer culture (JPQ-10 Energetic Conformity, measured in grade seven) are the ones who experienced the greatest increase in rejection by the peer group and in feelings of social inadequacy during early adolescence. It is suggested that those girls failed to adjust their behavior patterns to the changes in peer group values and expectations which occur in early adolescence. Among adolescent boys, no significant relationship was found between CYS Authoritarian Discipline and JPQ-10 Energetic Conformity and, in contrast to the girls, adolescent boys who score at either extreme of CYS Authoritarian Discipline were found to have improved peer relations during early adolescence, being increasingly perceived as "Behavior Models" to be emulated. This finding was interpreted as a reflection of the emergence of authoritarian and non-authoritarian leaders among adolescent boys, an interpretation which is consistent with the fact that both high and low authoritarian boys were perceived by thier age-mates as becoming more independent of adults and as having greater behavior autonomy in early adolescence.

As might be expected, authoritarian boys, being relatively more accepted, did not manifest increased feelings of social inadequacy, and only a sligh increase in personal maladjustment was associated with authoritarianism in boys. Nonetheless, CYS Authoritarian Discipline was found to be related to increases in anxiety and in hostility toward peers and society at large for boys, though to a lesser extent than for the rejected authoritarian girls.

All of the findings reported above were shown to be independent of measures of intelligence, social status, agreement-response tendency, and extreme-response tendency.

PERSONALITY FACTORS ASSOCIATED WITH AGE-MATE ROLE AND STATUS DESIGNATIONS

(Publication No. 60-1978)

Cono Galliani, Ph.D.
The University of Texas, 1960

Supervising Professor: Robert F. Peck, Ph.D.

The study concerned personality, intellectual, and social background factors associated with adolescent role and status designations. Peer status referred to levels of acceptance among age-mates. Peer role assignments referred to the categorical nominations of age-mates to "Wheel," "Brain," "Average One," "Quiet One," "Left Out," and "Wild One" roles. These categories were 'teen-age designations for some of the groups which comprise an adolescent society. Role and status designations were obtained through sociometric "Guess Who" instruments. One hundred eighty 14-year old boys and girls were studied. There were 30 adolescents (i.e., 15 boys and 15 girls) in each role. Initial selection was based on role, status, sex, and school location. The two personality measures used were Cattell's Junior Personality Quiz and Galliani's revision of Child's Need-Need Anxiety Scale. The intellectual factor included: Gestalt transformations, Gestalt completions, Mutilated words, Common situations, and tests of reading and listening comprehension. McGuire and White's index of social status (ISS) was used for ascertaining the social status of each adolescent. Different personality constellations were obtained through variance analysis for each of the roles studied. The significant personality factors were: achievement anxiety; emotional sensitivity vs. toughness; neurotic, fearful emotionality vs. stability or ego strength; adventurous cyclothymia vs. withdrawn schizothymia; socialized morale vs. dislike of education; and isolation anxiety. The intellectual factor differentiated between the roles at the .01 level. The "t" test was used to analyze the characteristics relevant for various levels of acceptance within each of the roles. Analysis of the data indicated, in addition, that there were significant differences between social visibility, intelligence, and ethnic background factors. Above average intelligence was found to be related (.01 level) to visibility factors with this group of adolescents. Anglo-Americans were significantly more visible to both the Latin Americans and the Anglo-Americans than were the Latin Americans. Suggestions were offered for further research.

DIMENSIONS OF ADOLESCENT BEHAVIOR

(Publication No. 60-6621)

Edwin Hindsman, Ph.D.
The University of Texas, 1960

Supervising Professor: Carson McGuire

This research was designed to demonstrate that there are some underlying frames of reference at work in adolescents' assessments of one another. More specifically, the following questions were asked: (a) Do sociometric valuations which adolescents are asked to make of one another depend upon something more than friendship, or the visibility a boy or girl has among age-mates? (b) Does the factor analysis of a wide range of sociometric items, representing various dimensions of manifest behavior, produce a set of sociometric variables fewer in number and more findamental in nature than the original tests? (c) Are there psychologically meaningful sets of cognitive and noncognitive attributes which account, in part, for the underlying frames of reference of adolescents' sociometric nominations of one another? and (d) Are there sets of cognitive and noncognitive attributes which serve as statistically significant predictors and which establish the consistency of the underlying frames of reference of adolescents' sociometric nominations?

Only a few studies reviewed in the literature have applied factor analytic techniques to sociometric data. The significance of the present research was the attempt to determine the psychological meaningfulness and consistency of sociometric factors.

The procedure involved two steps. First, in four sample populations (N = 1242, 608 females and 634 males), the members were asked to make assessments of one another in response to a wide range of nomination items. The 46 sets of nominations represented assessments of peer acceptance, social stimulus, value, model value, role assignments, social psychological attributes, and intellectual performance. The nominations received were then transformed to stanine values and factor analyzed. Ten factors were extracted for both boys and girls, and nine for the total population. Through factor matching, five factors were found to be common to the sexes and five specific to each sex. These factors represented second order sociometric variables for which factor scores were assigned. Upon the examination of the factor loadings the following names were assigned to the factors common to each

sex: Peer Acceptance, Negative Model Value, Social Effectiveness, Deviant Behavior, and Quiet Dependency.

The names assigned to the factors specific to boys were as follows: Avoided Brains, Artistic Temperament, Creative Imagination, Overt Impulsiveness, and Expedient Operator. The names assigned to factors specific to girls were as follows: Academic Competence, Personal Autonomy, Adult Oriented, Amoral Expedient, and Impulsive Daydreamer.

The second step was to determine, through multiple regression analyses, whether or not each common nomination factor and each factor specific to each sex was, in part, dependent upon some set of other known cognitive and noncognitive attributes of the subjects being studied. In addition, by the systematic selection of independent variables, the most efficient sets of criterion predictors were obtained from the total system of forty psychometric-type independent variables. Although not large, each of the coefficients was significantly different from zero.

From the analyses it was concluded that the nomination items were valid in the sense of being relevant to one another and combining to form meaningful factors. These factors, which represented second order variables, were predicted to a certain extent by sets of other known psychometric variables. The sets of predictors seemed to be psychologically meaningful and consistent and were interpreted as forming a part of the underlying frames of reference in adolescents' assessments of one another.

AN INVESTIGATION OF CROSS-VALIDATION IN
IN MULTIVARIABLE PREDICTION

(Publication No. 64-75)

Earl Jennings, Ph.D.
The University of Texas, 1963

Supervising Professor: Benjamin Fruchter

The multiple linear regression model has been used extensively by behavioral scientists in their attempts to predict the behavior of individuals. The least-squares weights obtained by use of this model in a pre-validation sample, however, tend to produce less accurate predictions when applied to new samples. This study was concerned with the systematic investigation of this "shrinkage" phenomenon.

A population of 500 adolescent boys and girls from four communities was randomly divided into five samples. In a pre-validation analysis, fifteen prediction equations were developed for each sample and measures of predictive efficiency (R^2ii) were obtained. Three criterion variables were utilized and the number of predictors in an equation ranged from five to twenty-five. All of the possible cross-comparisons (cross-validations) were obtained by applying the weights obtained for each equation, in each sample (i), to the predictors of the corresponding equations in the other four samples (j). This procedure yielded measures of cross-validated prediction (R^2ij). These steps were taken in order to investigate the frequency and magnitude of shrinkage ($R^2ij < R^2ii$) for the different criteria with the different numbers of predictors.

A new statistic, $\hat{R}^2ij$, was devised for the purpose of estimating R^2ij. The adequacy of $\hat{R}^2ij$ was then compared with Wherry's shrunken R^2 and with Burket's estimated weight validity, $\tilde{R}^2ij$. The comparison among the three statistics was performed in terms of the frequency with which each over-estimated R^2ij, and also with respect to the magnitude of the error in estimation.

A possible alternative to the regression model as a prediction method was described and evaluated. The technique allows one to sort a pre-validation sample into a number of mutually exclusive groups, homogeneous with respect to the predictor information. The homogeneity of the groups was determined by sorting together

276

those individuals with similar predictor patterns. The groups were formed in such a way as to maximize predictive efficiency (gR^2ii) in the pre-validation sample. The weights obtained in the pre-validation stage of regression analysis are biased by the fact that predicted values for individuals are dependent to a certain extent on the values they obtain. This bias is circumvented in the grouping procedure by choosing as a predicted value for an individual, the mean criterion value of the group to which he belongs exclusive of his own obtained scores. On cross-validation a subject for whom a prediction is desired is assigned to the group which has a predictor pattern most similar to his own. His predicted score is then the mean of that group.

Shrinkage of the squared multiple correlation coefficient (R^2ii) obtained by regression analysis occurred over 90 per cent of the time, and there was a pronounced tendency for the frequency and magnitude of shrinkage to increase as the number of predictors increased, regardless of the criterion. In general, equations with over fifteen predictors produced less accurate predictions on cross-validation than equations with fewer predictors, and this situation prevailed more frequently for the criterion variable with the lowest population value of predictive efficiency, p^2, than for the other two. Although R^2ii can be raised by adding predictors, the results of this study clearly indicated that no corresponding increase in R^2ij is assured.

Wherry's shrunken R^2 was an overestimate of R^2ij more frequently than $\hat{R}^2ij$ and the average magnitude of error was larger. No differences were found between $\hat{R}^2ij$ and $\tilde{R}^2ij$ in their effectiveness in estimating R^2ij. Wherry's shrunken R^2 was a better estimate of p^2 than $\hat{R}^2ij$ or $\tilde{R}^2ij$. Although the grouping procedure produced pre-validation measures of predictive efficiency (gR^2ij) which tended to shrink less frequently than R^2ii obtained by regression analysis, the cross-validated values (gR^2ij) were generally smaller than corresponding values (R^2ij) obtained using least-squares weights.

A CANONICAL ANALYSIS OF CRITERION AND PREDICTOR FACTORS OF TALENTED BEHAVIOR

(Publication No. 64-8015)

Robert J. Jones, Ph.D.
The University of Texas, 1964

Supervising Professor: Carson McGuire

A multidimensional definition of talented behavior was empirically derived for 716 public high school students from four Texas communities. A battery of original measures including two sociometric instruments, Teacher and Peer Nominations for various kinds of talent; the cumulative grade point average; the total score for the SCAT; achievement scores for science, social studies, and mathematics from the STEP battery; and a student checklist of fifteen behavior products constructed by the National Merit Scholarship Corporation on the assumption that such performances imply creativity, were synthesized into twenty-one dimensions of talented behavior by means of a factor analysis.

Seventh grade factor variables representing underlying dimensions of behavior were available for 450 of the 716 students. This set of seventh grade factors was related to the set of criterion factors representing talented behavior in high school by means of canonical correlational analysis in order to determine the number of statistically significant relationships between the two sets of factors. Accepting the five per cent level of confidence as a criterion, the two sets of canonical variates were related in five meaningful wasy. Since the factor variables in both sets of canonical variates were orthogonal, direct interpretation of the beta weight associated with each factor was possible, thus allowing characterization of the syndromes of predictors and criteria for each of the five relationships between the two sets.

Root one of the canonical analysis relates convergent thinking in the seventh grade with the following factors in high school: mathematical and scientific ability, teacher nominations as bright students, peer nominations as socially distant, and test taking ability. A seventh grade syndrome of low peer stimulus value, absence of negative valuations, and moderate convergent thinking ability was related in root two to a criterion syndrome of mathematical and scientific ability, language ability, the creation of scientific products, and teacher impressions as introspective but not bright students.

In the third root musical and language abilities combined with a lack of quantitative skills in a syndrome of behavior that peers regarded as socially distant and somewhat atypical but which teachers perceived as introspective and bright with political inclinations. The highest contributor to the related seventh grade syndrome was a marked lack of anxious-dependent resentment followed by a moderately low level of convergent thinking ability. A small contribution was made by factors representing absence of negative valuations, socially-oriented achievement motivation, practical minded toughness, and peer stimulus value.

Students with a low peer stimulus value in the seventh grade who received nominations as negative behavior models and who were low in anxiety and resentment of dependence characterized a syndrome which predicted, in root four, the high school syndrome of high dramatic and langauge ability associated with low abilities in athletics, mechanical skills, and in art. A moderate degree of musical ability was related to the syndrome, which was perceived by classmates as representing high social presence and by teachers as representing outgoing and ideal, but not necessarily bright, students.

High school athletes who had high test taking ability were low in both leadership and artistic ability. They had social presence as seen byppeers. Teachers regarded them not only as bright but also as ideal students. The related predictor syndrome described these persons as being very sensitive in the seventh grade, low in divergent thinking, and moderately high in convergent thinking ability. Low scores on the anxious-dependent resentment factor were also characteristic of the syndrome.

The canonical analysis has shown which of the criterion dimensions are predictable by the seventh grade factors, and the resulting relationships mediating criteria and predictors have generated researchable questions concerning talented behavior.

DEVIANT BEHAVIORS AMONG MALE ADOLESCENTS

(Publication No. 64-79)

Francis J. Kelly, Ph.D.
The University of Texas, 1963

Supervising Professor: Carson McGuire

Six measures (assumed to be in part measures of impulsivity), three assessments of value, one assessment of reported surgency and one assessment of reported family tension were used to obtain scores from 424 seventh grade male subjects assigned to a two-stage 2 x 3 factorial design. The independent variables for stage-one were (1) 12th grade deviant (delinquents and drop-outs) vs. non-deviant, and (2) three levels of social-class. The independent variables for stage-two were (1) 12th grade delinquents vs. drop-outs, and (2) three levels of social-class.

Scores on each of the dependent variables were subjected to an analysis of variance.

The 10 hypotheses and conclusions follow:

1. Male deviants perform more poorly than purported non-deviants on motor tasks that require cognitive control. (confirmed)
2. Middle-class male deviants perform more poorly than lower-class deviants on motor tasks that require cognitive control. (confirmed in part)
3. Male delinquents perform more poorly than drop-outs on motor tasks that require cognitive control. (inconclusive)
4. Male deviants perform more poorly than purported non-deviants on symbolic tasks that require maintenance of a convergent set. (confirmed)
5. Male delinquents perform more poorly than drop-outs on symbolic tasks that require maintenance of a convergent set. (not supported)
6. Male deviants characterize themselves as being more surgent than purported non-deviants. (confirmed)

7. Male deviants express less acceptance of dominant values than purported non-deviants. (not supported)

8. Male delinquents express less acceptance of dominant values than early school leavers. (not supported)

9. Male deviants report more family tension than purported non-deviants. (not supported)

10. Male delinquents report more family tension than early school-leavers. (not supported)

When a regression analysis was carried out, predicted scores were statistically significant. A cross validation of predicted group membership was carried out on a split sample, and the results were also, in general, significant.

RESPONSE BIAS IN MEASURES OF VALUE ACHIEVEMENT

(Publication No. 63-1674)

Paul G. Liberty, Jr., Ph.D.
The University of Texas, 1962

Supervising Professor: Carson McGuire

The purpose of this research was to test the thesis of Couch and Keniston (1960) that the agreeing response tendency reflects "an underlying personality dimension." Their formulation has been challenged by Edwards and Walker (1961a, 1961b) for failing to take into account the operation of the social desirability response set in the construction of a measure of "yeasaying" or acquiesence. In countercharge, Couch and Keniston (1961) stated that the Edwards Social Desirability Scale was itself confounding agreeing response set and social desirability.

The present study sought to investigate the existence of the agreeing (disagreeing) response set in a specific area of item content, that of value achievement, and attempted to obviate the methodological difficulties reported in the previous paragraph. Using the Strodtbeck (1958) and the de Charms, _et al_ (1955) value achievement scales a composite variable (D-S) was constructed by subtracting each person's stanined Strodtbeck score from his stanined de Charms score. Since the de Charms items are mainly keyed "agree" and the Strodtbeck items are keyed "disagree" the operation of agreeing-disagreeing response set was suspected. Thus the D-S measure was so constructed that high scores indicated agreers of yeasayers, while low scores indicated disagreers or naysayeers.

The research design provided for a careful analysis of the test behavior of college males (N = 141) in introductory psychology courses. Other measures were constructed to distinguish agreeing response set from value achievement and social desirability. A composite, or moderator, variable (S x D) of value achievement was constructed by multiplying each person's Strodtbeck and de Charms scores. In addition, a 12-item social desirability scale (SDS) was constructed. This scale contained items asking about the frequency, recency, and ease of arousal of certain feeling dimensions. Inasmuch as the SDS was not composed of items of the Likert-scale type (agree-disagree, true-false), the scale was believed to be free of the influence of the agreeing response tendency.

282

The general hypotheses were that, in a factor analysis of numerous variables, the variables D-S, S x D, and SDS would serve to mark the factors of agreeing response set, value achievement, and social desirability, respectively.

A principal axes factor analysis was performed from a 23 x 23 matrix including scores on projective need measures and feeling as well as sociological scales of the non-Likert-type format. Scales of the non-Likert-type format were preferred because these would serve to eliminate the tendency to mark "agree" or "disagree." In this manner, "true" or "underlying" correlates of the agreeing response tendency could be ascertained. Nine factors accounting for 72 per cent of the total variance were found and these remained after varimax rotation. The three hypothesized factors of agreeing response set, value achievement, and social desirability emerged as predicted.

The only correlates of the agreeing response tendency were Mother Approval of Father and negative need affiliation. Although the finding on need affiliation indicated some support for the Couch and Keniston position, essentially negative results were observed. Anxiety and mania were not related to the agreeing response dimension but both were negatively related to social desirability.

The general interpretation was that, very likely, Couch and Keniston had confounded social desirability and agreeing response set in their measurement procedure. Furthermore, support was indicated for the view that no general attribute of response acquiescence exists independently of the measures to assess it. Thus agreement response set appears to be a function of certain situational variables and, in particular, the perceived desirability of the statement.

A STUDY TO EXPLORE NEW METHODS OF IDENTIFYING AND MEASURING MUSICAL TALENT

(Publication No. 66-14420)

Wendell Lincoln Osborn, Ph.D.
The University of Texas, 1966

Supervising Professor: Carson McGuire

The purpose of this study was to investigate relationships between musical talent and variables representing certain non-auditory characteristics in persons, in terms of a transactional or context theory of human behavior. A research model expressed musical talent as a function of personality, cognitive, attitudinal, and sociocultural variables operating within and outside of the individual. Subjects were students in the 1963 graduating classes of four Texas high schools who were divided into two operationally defined criterion categories, "musical" and "non-musical." The "musical" subjects were those students belonging to one or more of eight classification of observed musical behavior. "Non-musical" subjects were students belonging to none of these classification.

The two hypotheses tested were: (1) Musical talent can be predicted by means of a selected set of variables represenging non-auditory intrapersonal and interpersonal attributes; and (2) There should be no statistically significant loss of predictive efficiency when weights assigned to a set of predictors on the basis of one sample population are applied to data from other samples.

The independent variables were socres on 41 measures representing pertinent aspects of the theoretical categories of the research model. Multiple linear regression analyses were employed to obtain efficient subsets (linear combinations) of variables from among these 41 measures, for predicting to the musical talent criterion. To test the first hypothesis, one analysis employed a dichotomous "musical vs. non-musical" criterion. Two additional analyses employed weighted criterion scores based upon classification of musical behavior to which subjects belonged. Efficiency of various obtained subsets of independent variables was assessed by means of F-ratios of respective squared multiple correlations.

The second hypothesis was tested by a series of cross validations which treated each of the four community samples as separate sample populations. A four-variable model was employed to predict

to the dichotomous criterion. Three cross validations were performed, each employing three sample populations. Regression weights assigned to one sample were applied to a second sample to obtain an optimum cutting score for total number of correct predictions. Regression weights and cutting score were then applied to a third sample to obtain an unbiased cross validation. Results furnished moderate support to the first hypothesis, but not to the second. From the original 41 independent variables, an obtained seven-variable model had a squared multiple correlation of .17 with the dichotomous criterion; five- and three-variable models had squared multiple correlations of .12 and .13 in analyses employing weighted criterion scores. Variables representing theoretical categories of Social Adjustment (emotional sensitivity), Divergent Thinking (foreseeing consequences), Perceptual-Motor Skills, and Convergent Thinking were most closely related to the musical talent criterion. In each of the cross validations, predictions made on the basis of obtained models were not superior to predictions employing the base rate of the sample. The possible value of the research model and procedures empoyed in this study for future investigations was discussed. Implications for college and lower level music education were considered.

FACTORIAL DIMENSIONS OF CREATIVITY

(Publication No. 64-110)

Norman J. Spector, Ph.D.
The University of Texas, 1963

Supervising Professor: Carson McGuire

FACTORIAL DIMENSIONS OF CREATIVITY is a research study which seeks to explore similarities and differences in the psycho-social functions of seventh grade boys and girls of differing levels of creativity (according to a quantitative creativity criterion). Common behavioral dimensions across experimental groups are defined and inter-group variations in psycho-social functions related to each dimension are examined. Research procedure involves factor analyses, factor matching techniques, and an experimental design which permits the derivation of the common dimensions. The data base are quantitative measurements for each individual of 48 cognitive and non-cognitive variables representing psychological and sociological attributes and aspects of behavior, and stanine scores on the creativity criterion. The experimental population and associated measurements were drawn from the data banks of the Human Talent Project at The University of Texas.

The research design involved the identification of boys (N=401) and girls (N=370) in four Texas communities according to three levels of creativity. The creativity criterion, Divergent Thinking, was a synthetic "factor in persons" developed in prior work by the Human Talent Research Project at The University of Texas, and capable of ranking individuals by stanine values. The 771 seventh grade pupils were divided according to sex and dsitributed into High Creative (7-9 stanines), Moderate Creative (4-6 stanines), and Low Creative (1-3 stanines) subpopulations for a total of six basic experimental groups. Five additional groupings were formed by recombinations of the six basic groups in order to meet the requirements of the experimental design. The five additional groups were Creative Boys (1-9 stanines), Creative Girls (1-9 stanines), High Creative Boys and Girls (Boys and Girls, 7-9 stanines), Moderate Creative Boys and Girls (Boys and Girls 4-6 stanines), Low Creative Boys and Girls (Boys and Girls, 1-3 stanines). Analytical procedures involved factor analyses of the intercorrelation matrices of 48 cognitive and non-cognitive variables for each of the eleven experimental groups, followed by factor matchings between groups, and a special technique for the derivation of common behavioral dimensions. The special technique involved a sequence of factor matchings between groups in such fashion that paired matchings ultimately span the six basic experimental

groups to indicate common dimensions. All the computational procedures were performed at The University of Texas Computation Center on the CDC 1604 Computer. The factor analysis and factor matching programs are filed at the Center and identified, respectively, as ABSTRAC and FACHMACH.

According to a research paradigm which sets forth the major transactional characteristics of talented behavior, the 48 variables employed in the study might be broadly categorized as Personality Needs and Drives, Personality Affective States, Personality Attitudes/Behavioral Orientation, Psychomotor Abilities, Cognitive Attributes, and Sociological Nominations. Analytical procedures performed upon intercorrelation matrices of these variables identified four major common dimensions which may be characterized as Affective (I), Motivational (II), Reputational (III), and Cognitive (IV). The Affective dimension seems to express in many ways the uncertainties that these seventh grade children perceive in their relationships with the world, and their abilities to cope with them. The Motivational dimension is best expressed and considered as motivational patterns in the scholastic setting. The Reputational dimension presents these children as they perceive and value one another without reference to any specific environment such as the classroom. The Cognitive dimension is heavily weighted by a preponderance of cognitive variables such as various forms of educational achievement tests. Within each of these dimensions, common behavioral patterns are shown across groups, with deviations from these patterns within groups. Additional conclusions such as the independence of cognitive measures from the creativity criterion are inferred from the date.

The study contains many implications for further research in the domain of creativity and should prove of interest to both educators and research specialists. The special factor matching techniques and procedures developed for the identification of common dimensions should prove a useful tool in future investigations.

ANTECEDENTS AND CONCOMITANTS OF CHANGE IN TEACHER EVALUATION OF PUPIL PERFORMANCE

(Publication No. 64-11844)

Fay H. Starr, Ph.D.
The University of Texas, 1964

Supervising Professor: A. C. Murphy

Scores from 22 variables were used with multiple linear regression techniques adapted for CDC 1604 computer to assess differences among 94 junior high school Anglo-American boys and girls of four Texas communities participating in the Human Talent Research Program[1] and who were classified into two subsamples of "Upbound" or "Downbound" Ss. Classification was determined by an increase or decrease of two or more stanines in grade point average from the seventh to the ninth grade. Stanine values were determined from the GPA's of 932 students enrolled both years under consideration.

GPA was regarded as a function of (a) a combination of potential, cognitive, perceptual and psychomotor abilities, (b) elements of attitudes, personality and motivation, especially expectations about one's own behavior and the probable responses of others, (c) responses of other persons such as peers, parents, teachers or significant others, (d) sex role identification (boy or girl), and (e) the context or situation in which the behavior occurs (community A, B, C, or D).

Arithmetic, language, and reading achievement test values obtained for both grades did not parallel the marked changes in GPA. Increases in grade placement level for the standard tests were significant for both subsamples. Mean values for *downbound* Ss, however, were higher than for *upbound* Ss, at both grade levels only arithmetic achievement being significantly higher at both grade levels. The inference is that teacher evaluations (grades) were not based solely upon gain in factual or technical knowledge as measured by achievement tests.

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[1] Cooperative Research Project No. 742, Office of Education, U. S. Department of Health, Education and Welfare.

At the seventh grade, when their grades were higher, downbound Ss, compared with upbound Ss, were hypothesized to be more positively evaluated by age-mates on sociometric nomination items of academic competence and social acceptance (supported), more expressive of motivation toward scholastic attainment (supported), as having more socialized morale (supported), characterized by divergent, rather than convergent thinking patterns (not supported), with less expressed anxiety (supported), less family tension (inconclusive), and more expressive of surgency (not supported), the reverse being true for the latter.

At the ninth grade, no significant differences were found between subsamples. Nevertheless, certain changes were significant within subsamples. Downbound Ss now expressed themselves as less motivated toward school and with greater dislike for school. Age-mates considered them less "Verbal," with less "Math Ability," but as better "Academic Models" and as more desirable to "Party With."

Interaction F ratios indicated significant changes in mean differences from the seventh to the ninth grade for CMAS Anxiety, JPQ-8 (surgency), and age-mate nominations "Verbal," "Brains," "Math Ability," and "Behavioral Model." Lines representing mean values tended to converge at the ninth grade. Inverted mean differences which yielded nonsignificant F ratios for SSHA Motivation and JPQ-8 (Socialized Morale vs. Dislike for School) were interpreted to reflect a statistical reversal (equal and opposite) of position.

No antecedent conditions were found in the data indicative of the GPA change prior to its occurence. Changes in variable values tended to be concomitant with and subsequent to GPA change.

The theoretical model, utilized in a search for the most efficient set of predictors for GPA for all 94 Ss, yielded a multiple correlation of +.536 compared with +.128 for previous GPA, IQ, and Achievement Test scores. The best set of predictors was obtained by a systematic regression reduction analysis whereby variables were dropped one by one until only those remained which contributed significantly to the squared correlation coefficient and included measures of Sex Role, STEP Listening, SSHA Motivation, Family Tension and "Academic Model."

DIMENSIONS OF TEACHER EVALUATION OF ACADEMIC ACHIEVEMENT

(Publication No. 65-4357)

Lonnie Ray Whiteside, Ph.D.
The University of Texas, 1964

Supervising Professors: Carson McGuire and A. C. Murphy

McGuire's theory of human behavior was investigated relative to one socially defined talent, high school academic achievement as evaluated by teachers, and from the standpoint of three questions:

(1) Does an operationally defined measure of each of the theoretical categories (presumed to be basic dimensions underlying human behavior) contribute independently to grade point average (GPA) prediction in the presence of measures representing every other theoretical category?

(2) Can a relatively small set of predictor variables be selected that would appear to be useful in the real-world situations of the public schools?

(3) What evidence is there that such a set of predictor variables will actually retain their stability when regression information from one sample of subjects is applied to a new sample?

Part I. Test of Theory

The basic data pool was represented by two or three variables presumed to measure each of the "factor in persons" hypothesized as independent dimensions in McGuire's theory.

Briefly, the theory states that behavior is a function of an individual's abilities, of his attitudes and expectations--either motivational or inhibitory, of his response tendencies to the sociological pressures of both age-mates and adults, and of sex-role and cultural context variations.

Using the multiple linear regression technique in a data reduction process, the most useful predictor per category was selected:

Theoretical Category	Postulated Measure
Catalyst	STEP Listening
Convergent Thinking	CTMM Mental Function
Divergent Thinking	Seeing Problems
Symbol Aptitude	Mutilated Words
Conformity Motivation	SSHA Scholastic Motivation
Neurotic Anxiety	CYS Personal Maladjustment
Authoritarian Socialization	CYS Negative Social Orientation
Peer Acceptance	Nomination: Academic Model
Sex-role	Binary variable (1 = female; 0 = male)

Each of the variables in the full regression model was deleted one at a time in order to compute a series of restricted regression equations. Every variable except CYS Negative Social Orientation contributed significantly to the prediction of high school GPA in the presence of the other predictors ($p < .01$).

Part II. Practical Prediction

From the measures utilized in the full model selected in Part I, a subset of variables was selected to form a combination that maximized predictive efficiency and more or less minimized the number predictor measures involved. Beginning with the best single-predictor of high school GPA--ninth grade GPA squared--other variables were accumulated into the system. When an additional measure failed to increase the multiple RSQ significantly ($p < .01$), selection ceased.

The subset consisted of: (1) CTMM times STEP Listening, (2) ninth grade GPA squared, (3) Mutilated Words, (4) Peer Nomination: Academic Model, and (5) Sex-role. These independent variables contributed to the explanation of 69.7% of the criterion variance. (The first two along accounted for 67.7% of the variance.)

Part III. Cross Validations

Applying the regression weights obtained from community to the data from each of the other communities, twelve cross validations were computed using as predictors (1) raw scores only, (2) factor scores plus ninth grade GPA squared, and (3) stanined scores for a total of 35 cross validations.

Although there was always a reduction in predictive efficiency when cross validations were compared with prevalidations by a coefficient of determination, the reductions were not excessive. Two reductions were significant at $p < .05$ and two at $p < .01$ with the raw score data. Three cases utilizing factor scores and two instances involving stanined scores resulted in significant RSQ reductions.

Prevalidations ranged from a low of RSQ = .6216 (a factor score case) to .8032 (raw scores). Cross-validated RSQ's ranged from .6019 (factor scores) to .7967 (raw scores).

APPENDIX D

BIBLIOGRAPHY OF HTRP PUBLICATIONS, 1952-1967

The HTRP files, maintained in Sutton Hall 310, The University of Texas at Austin, Austin, Texas, 78712, and the materials stored with the Research and Development Center for Teacher Education are available when suitable arrangements are made for their use. For information regarding use of data files and IBM master cards (MFN numbers in Appendix A, Section III) as well as photocopies of the original HTRP papers and publications, please write to the principal investigator, Dr. Carson McGuire, Sutton Hall 310, The University of Texas at Austin, Austin, Texas 78712.

APPENDIX D

BIBLIOGRAPHY OF HTRP PUBLICATIONS, 1952-1967

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